United States Court of Appeals

for the

District of Columbia Circuit

TRANSCRIPT OF RECORD

BRIEF FOR APPELLANT AND JOINT APPENDIX

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 11,607

EMMOR H. MILLARD, *Appellant*

v.

ROBERT C. WATSON
~~JOHN A. MARZALL,~~ Commissioner of Patents, *Appellee*

840

United States Court of Appeals
for the
District of Columbia Circuit

FILED FEB 6 1953

Joseph W. Stewart
CLERK

Appeal from the Judgment of the United States District Court for the District of Columbia

MELVILLE E. JONES,
Attorney for Appellants.

PRESS OF BYRON S. ADAMS, WASHINGTON, D. C.

STATEMENT OF QUESTIONS PRESENTED

1. Whether the Appellant is entitled to a patent for an invention in a method which contrary to expectation more accurately and expeditiously enables formation of round tube or pipe of any practical size from metallic plate.

2. Whether it is reversible error to follow assumptions based on inadequate disclosures of the references, where witnesses of outstanding authority and integrity presented undisputed testimony by deposition for the trial, unshaken on cross-examination on behalf of Appellee, testified that the claimed steps gave a result unexpected and unpredictable from the teachings of the prior art, in that in the production of the tube or pipe "spiral" meeting edges are avoided.

3. Whether it was not reversible error under the facts of the preceding question to provide steps which attain the result of producing in a machine, such pipe longer than the machine itself.

12.

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IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

APPEAL No. 11,607

EMMOR H. MILLARD, *Appellant*,

v.

JOHN A. MARZALL, Commissioner of Patents, *Appellee*.

Appeal from the Judgment of the United States District Court for the District of Columbia

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BRIEF FOR APPELLANT

JURISDICTIONAL STATEMENT

The jurisdiction of the District Court of the United States for the District of Columbia was invoked under Revised Statute 4915, Section 63 of Title 35 of the United States Code. The jurisdiction of this Court is invoked under Section 1291 of Title 28, United States Code, and Title 17, Paragraph 101 of the District of Columbia Code to review the action of the District Court in this proceeding.

This appeal results from a civil action brought to obtain a patent on an invention for forming tubes or pipe. Appellee answered admitting the jurisdiction of the Court below to entertain the action. After trial, the Court below dismissed the action at the cost of the Appellant. Appellant duly served and filed his notice of appeal.

STATEMENT OF THE CASE

This is an appeal from a judgment of the District Court refusing a patent on a Method of Forming Tubes or Pipe which enables round tubes or pipe to be practically and expeditiously shaped from flat metallic plate, usually steel, and thereafter welded at the meeting edges or seam. Appellant is not the first to seek this result, but it is maintained that he is the first to have actually attained such result from a practical standpoint.

The Court below affirmed the decision of the Patent Office in a memorandum opinion stating: "The Court finds that the Plaintiff's application fails to disclose any invention over the prior art." J.A. 9. In so holding, the Court below erred in not perceiving that the prior art did not attain the new result pointed out by qualified experts and erred in not giving weight to the testimony of those qualified experts. The claims are not alleged by Appellee to be met by any one reference. In every instance of rejection, the references are combined.

The prior art did not know how to practically and expeditiously make tubes or pipe from metallic plate prior to appellant's invention, notwithstanding the teaching had long been sought, because it was not known how to avoid the "spiral" at the meeting edges or seam of the plate when shaped into tubular form according to prior art practice. This result which avoided the "spiral" was critical, being necessary to enable expeditious and practical manufacture in a machine and especially passage in a rectilinear or straight line path through a welding machine in continuous line production. In the absence of this result the pipe would not be true to shape, or sufficiently accurate to be seam-welded to avoid strains, leaks, and permit entry of moisture or deleterious matter.

The Court below erred in finding that invention had not been shown and that the references, taking them at face value and further in the light of the testimony of expert witnesses, warranted a conclusion that the steps of the critical and new result-attaining procedure is obvious.

Commercial Success

While commercial success cannot be given undue weight, it should not be ignored and is a factor of probative value. Over 200,000 feet of pipe have been formed by the method. J.A. 28, Q. 11.

British Patent Granted for the Instant Invention

British patent No. 659,307 has issued to Fort Pitt Bridge Works, Pittsburgh, Pa., on Appellant's invention. (J.A. 31, Q. 36) Copy of "Plaintiff's Ex. British patent" is part of the record.

POINTS RAISED ON THIS APPEAL

Appellant states the following points of error in the decision and judgment below:

(1) The Court erred in dismissing the complaint.

(2) The Court erred in entering judgment dismissing the complaint.

(3) The Court erred in finding that invention had not been shown in the plaintiff-appellant's patent application.

SUMMARY OF ARGUMENT

Appellant is the first to teach the art steps which expeditiously and in a commercially practical manner enable the making of tubes or pipe from flat metallic plate, usually steel, with the meeting edges welded into a seam.

The result was new, unexpected, unpredictable and critical in that the knowledge of the art only went so far as to teach how to produce tubes from metallic plate having "spiral" meeting edges which precluded efficient welding or seaming and especially passage of the tube through a welding machine to complete the pipe (J. A. 30, Q. 25).

The claims involve invention as the steps attain the desideratum long desired in the art of producing round tube or pipe with the free longitudinal edges in parallelism and thereby generally co-acting in the continuous formation of tubes and pipe from plate in a press. The art did not know what step or steps would avoid the production of a "spiral" or distortion at those longitudinal edges, and in holding the prior art to anticipate it is reversible error to rely on the 20-year old U.S. Patent to Baker 1,852,101; U. S. Patent to Richter 1,831,033 of about the same age (showing it old broadly to weld tubing which appellant has never denied) and U. S. Patent to Minshull 977,118 over 40 years old.

Minshull does not even make round tubing. Minshull is set up for the first time in Defendant-Appellee's Answer.

It is respectfully submitted that Appellant, over the art, is the first to have accomplished this new result of avoiding a "spiral". The accomplishing of a new or improved result has always been a test for the presence of invention. Appellant has discovered a defect in the known methods of making pipe from plate and has remedied that defect.

Appellant's process enables continuous or line production of pipe from plate in a machine; it being possible to perform the steps on two aligned plates, usually as one is stripped from the machine as a formed pipe, another plate follows it. The steps even enable formation of a pipe longer than the machine in which it is formed.

ARGUMENT

As an instance in forming or manufacturing pipe according to the invention the pipe may be 40 feet long with 10-3/4 inches outside diameter; and the plate from which the pipe is formed may be 33 inches wide and from 1/4 to 5/16 inch thick and weigh in the neighborhood of 1100 or 1200 pounds. (J.A. 28 Q. 11, Q. 12). Accurate and precise handling and positioning is necessary.

The Claims

All claims are copied in the Complaint below. (J.A. 3, 4, 5 & 6) Copy of the specification appears on page J.A. 34 and prints of the drawings will be found on J.A. pp. 41-43.

The Court below erred in not holding that each claim 1, 7, 8, 10, 11 and 12 differed specifically from the others, and that each is patentable primarily since it recites the method of bending a plate while freely supported at opposite sides for all bending steps by one of the two coacting dies, coupled with the steps of moving the plate laterally in one direction and then in the other direction, and to the critical bending positions inherently while in the machine; in not holding that claims 8, 11 and 12 are further patentable because the method steps depend upon practice in a machine having the relatively narrow rigid web, and in not holding that claims 3, 4 and 5 are patentable as each recites the method of bending a plate while freely supported at opposite sides for all bending steps by one of the two coacting dies coupled with the bending of the edge portions and then the intermediate portion as developed therein.

The Prior Art

Baker patent 1,852,101 is the main reference. (J.A. 60) The experts never heard of the Baker machine ever being actually built. (J.A. 15, Q. 33, and J.A. 24, Q. 25) By some procedure, not apparent from the drawing or specification, it is respectfully contended, a cylinder is described as formed by Baker from plate. Before further considering Baker, it is to be remembered in connection with many inventions that the same machine can often be used to perform a number of different methods to accomplish the same end or result and that although certain features or even views appear to be somewhat similar or even identical in the claimed and reference structures, this is not the criterion for deciding the presence of invention in a method or process, nor is it necessarily of any unusual moment.

The recent case of *Broderson* v. *Marzall,* 194 F. (2d) 138, 90 U.S. App. D.C. 78, decided by this Court is believed to be strikingly in point. There, an application for patent was involved relating to a method of operating internal combustion engines using two homogeneous mixtures of fuel and air. Your Honors realized that one engine on the whole looks very much like any other engine, it is contended. Whether or not any of the apparatus used by Appellant looks like that in a reference is submitted to be immaterial in the light of the decisions along this general line. There was expert testimony in that case which was given weight. This Court in the decided case noted that features of the apparatus of the Appellant were all old separately. It said:

> "But the application for patent is not directed at features of design. The applicant claims a method of operation."

In Baker patent 1,852,101, it is not even disclosed how the plate or sheet is supported in the different steps of whatever procedure Baker contemplated. Imagine trying to handle or position a plate of 1100 or 1200 lbs. accurately with respect to a pointed edge forming a fulcrum as at either upper edge of Baker's female die. It is not obvious to freely and accurately support the plate as Appellant does in not only one instance, but in three, and in fact, it is vital. There is relative lateral sliding movement between Baker strut member 1 and the die D (page 2, line 35 et seq.) and also following the Baker teaching the die obviously must be supported other than by the strut member. It is urged that parts 1 and 6 of Baker do not and cannot transmit the bending load to the male die. Keeper 8-9 requires operation in stripping every pipe and is an obstruction just the same as whatever mechanism supports the die D at the other end (Baker, page 2, lines 3 to 13) precluding the possibility of following the highly advantageous steps of continuous feeding and stripping of the plate longitudinally to and from the machine and the forming of pipe actually longer than the machine itself, a result which is not true in Baker.

While this is clear from a consideration of the Baker patent 1,852,101, the plate in Baker is fed, the expert witnesses agree, between the dies from opposite sides of the machine and that for each operation the approximately 1200 lb. plate has to be removed from the machine or dies, turned horizontally and carried horizontally from one side of the machine to the other and again fed into the machine according to the arrows in Figs. 4 and 5. The plate in Baker was intended to be supported from overhead by chains or cranes. (J.A. 18, Qs. 65, 66; J.A. 25, Q. 51; J.A. 29, Q. 16)

More Than Support Three Times Is Essential

There is no step like that predicated on employing Appellant's female die which in addition to any supporting function must with safety to the workmen catch the plate on rebound as it lowers after a pressing operation or to enable accurate positioning and free support of the plate. (J.A. 29, Q. 17) Cross-examination of the witnesses does not negative these facts. The line edges at the top of the die A in Baker cannot do it. Baker does not avoid the "spiral" and it is error to hold that it is obvious for Appellant to teach how it could be avoided.

Witness Bradburn discusses the Baker procedure to better advantage. (J.A. 13 & 14) Directly in point also is the discussion of Baker by the witness Hutchinson (J.A. 23 & 24) and by Appellant Millard. (J.A. 29, 30 & 31)

Richter patent 1,831,033 (J.A. 56) is relied on to show it to be broadly old to weld tubing. Plaintiff has always freely admitted this of itself to be broadly old.

Minshull patent 977,118 (J.A. 51) calls for a method of making slotted tubular tracks. It was set up for the first time in Appellee's Answer, and is relied on to show dies A and/or B as supports for plate. This patent is over forty years old; twice as old as the other reference patents. Minshull does not even make a round tube but deliberately makes the track out of round and the method followed by Minshull employs at least three sets of female dies as at A, B and C.

The unusually well qualified expert Bradburn in answer to Q. 2 (J.A. 12) said:

> "In forming these tubular sections of course it is necessary that they are a specific diameter and the edges are parallel in order that we get the best results from welding."

Note further the Bradburn answer to Q. 23 concerning the free support of the plate on the female die and reference to the plate trying to spiral (J.A. 14) (J.A. 24, Q. 22) is to substantially the same effect, and Appellant Millard (Qualifications, J.A. 28), Q. 26 (J.A. 30) makes it clear that without following his claimed steps with respect to the plate

> "We couldn't put it through the welding machine."

Appellant's process further co-acts in the continuous or line production of tubes or pipe from a machine, it even being possible to perform the steps on two aligned plates, usually as one plate is stripped from the machine as a formed plate, another plate follows it. The steps enabling formation of a pipe longer than the machine is emphasized by each expert: Millard, Qs. 14, 16, 18 (J.A. 28, 29 & 30) for instance.

That the Appellee and the Court below erred in giving weight to the references is clear. Consider the case of International Cellucotton Products Co. vs. Sterlick Co. 94 F. (2d) 10; 37 U.S.P.Q. 6—

> "History counts for more than anything else in judging invention; and a long interval between developments justifies the inference that the transition from old to new was not easy, whereas immediate transition implies the reverse."

Further sound law is:

> If those skilled in the mechanical arts are working in a given field and have failed after repeated efforts to discover a certain new and useful improvement, he who first makes the discovery has done more than make the obvious improvement which would suggest itself to a mechanic skilled in the art and is entitled to protection as an inventor. Expanded Metal Co. et al. vs. Bradford et al. and The General Fireproofing Co. vs. The Expanded Metal Co; 214 U.S. 366.

In Goodyear Tire & Rubber Co. Inc. et al. vs. Ray-O-Vac Co. 321 U.S. 279, the view of the Court was as follows:

> "Viewed after the event, the means Anthony adopted seem simple and such as should have been obvious to those who worked in the field, but this is not enough to negative invention. During the period of half a century, in which the use of flash-light batteries increased enormously, and the manufacturers of flashlight cells were conscious of the defects in them, no one devised a method of curing such defects. Once the method was discovered, it commended itself to the public as evidenced by marked commercial success. These factors were entitled to weight in determining whether the improvement amounted to invention and should, in a close case, tip the scales in favor of patentability."

Richter and Minshull further show some of the difficulties encountered in bending plate and they proposed solutions, but far short of appellant's. If Appellant's steps were as simple as Appellee contends, why did not Baker take advantage of their teaching?

Supports may be of various kinds; overhead, below, rigid, flexible or otherwise and of different areas and degrees, and the plate could be clamped thereto, suspended therefrom, or be free thereon, etc. All steps of appellant are critical.

The Patent Office itself has recognized invention where a support was necesary, holding—

> A method of "preparing work for machining, consisting in performing the work with a circumferential groove perpendicular to the axis of the work of V-cross section, and supporting the work solely by means of the contact of arcuate wedges with the opposed faces of said groove" is patentable if not anticipated. Strauss, 56 USPQ 333.

Not only one but three steps involving support are material and critical in the claims on appeal. The art did not discover or remedy the difficulty in Baker.

> D. C. Mass. 1945. The history or condition of the trade or art to which the patent is applied may be considered in determining the existence of invention and important in this regard is the fact that the patentee has succeeded where others have failed; holding patentable a shoe machine providing a continuous rather than a step-by-step lasting operation, the first successful machine of that type on the market, which enables an operator to do 1500 pairs of shoes per day as against a former output of 500 to 600 pairs under the old commercial practice.
>
> Kamborian et al. v. United Shoe Mach. Corp., 62 F. Supp. 903; 67 U.S.P.Q. 204.
>
> "In order that a reference or group of references may teach a process, the process must be deliberate and the means understood."
>
> Kelly v. Coe, 99 F. (2d) 435; 69 App. 202. D.C.

In Carnegie Steel Co. v. Cambria Iron Co., 25 U. S. 403, S. C. 22, the majority opinion by Mr. Justice Brown states, at page 715:

> "It should be borne in mind that this process was one not accidentally discovered, but was the result of a long search for the very purpose. The surprise is that the manufacturers of steel, having felt the want for so many years, should never have discovered from the multiplicity of patents and of processes introduced into this suit, and well known to the manufacturers of steel, that it was but a step from what they already knew to that which they had spent years in endeavoring to find out. It only remains now for the wisdom which comes after the fact to teach us that Jones discovered nothing, invented nothing, accomplished nothing.
>
> We cannot better conclude this opinion than by the following extract from the opinion of Mr. Justice Bradley in Webster Loom Co. v. Higgins, 105 U. S. 580, 591, 26 L. Ed. 1177, 1181; "But it is plain from the evidence, and from the very fact that it was not sooner adopted and used, that it did not, for years, occur in this light to even the most skillful persons. It may have been under their very eyes; they may almost be said to have stumbled over it; but they certainly failed to see it, to estimate its value, and to bring it into notice. * * * Now that it has succeeded, it may seem very plain to anyone that he could have done it as well. This is often the case with inventions of the greatest merit. It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result, never attained before, it is evidence of invention."

CONCLUSION

It is respectfully urged that the application for patent in suit presents claims involving invention, and it is therefore urged that the Judgment dismissing the Complaint be reversed and a Judgment here rendered against the Appellee, granting the relief prayed for in the Complaint upon the record made in the Court below.

Respectfully submitted

Melville E. Jones,
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Washington, 4, D. C.
Attorney for Appellant.

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IN THE

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No. 11,607

EMMOR H. MILLARD, *Appellant*

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JOHN A. MARZALL, Commissioner of Patents, *Appellee*

Appeal from The United States District Court
for the District of Columbia

JOINT APPENDIX

I.

PLEADINGS, DOCKET ENTRIES AND OTHER PAPERS

* * * * * * * * * *

1 IN THE DISTRICT COURT OF THE UNITED STATES FOR
THE DISTRICT OF COLUMBIA

Filed April 18, 1951

Civil Action No. 1598-51

EMMOR H. MILLARD, Mt. Lebanon, Pittsburgh, Pa., *Plaintiff*,

vs.

JOHN A. MARZALL, Commissioner of Patents, Washington, D. C., *Defendant*.

Bill of Complaint for Letter Patent

The plaintiff herein for his Bill of Complaint alleges:

(1) The plaintiff, Emmor H. Millard, is a citizen of the United States and resident of Mt. Lebanon, Pittsburgh, in the County of Allegheny, and State of Pennsylvania.

(2) The defendant, John A. Marzall, is the Commissioner of Patents for the United States, whose official residence is in the District of Columbia, and who is sued as Commissioner of Patents for the United States.

(3) This Bill is filed in accordance with the provisions of Federal Laws of the United States as provided for under Revised Statute 4915 (Title 35, Par. 63).

(4) Prior to January 23, 1948, the plaintiff, Emmor H. Millard was the first and sole inventor of certain novel and useful improvements in a Method of Forming Tubes or Pipe, not known or used before his invention or discovery thereof, or patented or described in any printed
publication in any country before his invention or dis-
2 covery thereof, or more than one year prior to said
application, or in public use or on sale in the United
States for more than one year prior to this application,

which invention was not patented in any country foreign to the United States on an application filed by him or his legal representatives or assigns more than twelve months before his application, on which invention no application for patent has been filed by him or his representatives or assigns in any country foreign to the United States, and which invention has not been abandoned.

(5) That being, as stated the original, first and sole inventor of such invention and entitled to a patent therefor, the said Emmor H. Millard on or about January 23, 1948, duly filed in the United States Patent Office an application for Letters Patent for the said invention complying in all respects with the requirements of the law in such cases made and provided; and that the said application filed on or about January 23, 1948 was given a filing-date of January 23, 1948 and Serial No. 3971.

(6) Since the filing of said application Serial No. 3971, said application has been duly prosecuted, all of the laws of the United States and all of the rules of the Patent Office with respect to the filing and prosecution of said application having been duly complied with.

(7) The said application Serial No. 3971 has been passed upon by the Primary Examiner who finally rejected claims 1, 3, 4, 5, 7, 8, 10, 11 and 12 which are reproduced herewith:

1. The method consisting in bending plate at a portion adjacent one edge thereof between coacting arcuate male
and female surfaces of relatively movable dies while
3 said portion is freely supported by one of the dies at
opposite sides of the female surface, moving the plate across said surfaces and bending the plate along the portion thereof adjacent the other edge by means of said surfaces while freely supported by said one die at opposite sides of the female surface, returning the plate across said surfaces toward initial position, and then moving the free edges of the portions of the plate toward each other through bending of the portion of said plate between said portions with said surfaces.

3. The method consisting in shaping plate between a male die and a female die while said portion is freely supported by one of the dies at opposite sides of the female surface consisting in bending the plate along one edge portion with said dies, bending the plate in spaced relation to said edge portion and along the opposite edge portion with said dies while freely supported by said one die at opposite sides of the female surface, and then moving the edges of said portions toward each other by bending the plate intermediate said portions with said dies.

4. The method consisting in bending plate along the edge portion with a mating male die and female die, consisting in bending the plate along one edge portion with said dies, while said portion is freely supported by one of the dies at opposite sides of the female surface, bending the plate in spaced relation to said edge portion and along the opposite edge portion with said dies while freely supported by said one die at opposite sides of the female surface, and
then moving the edges of said portions toward each
4 other by bending the plate intermediate said portions with said dies, while freely supported by said one die at opposite sides of said female surface.

5. The method consisting in bending plate along one portion thereof between a male die and a female die having spaced surfaces which are in concentric relation at the end of a bending operation, consisting in bending the plate along one edge portion with said dies while freely supported by said one die at opposite sides of the female surface, bending the plate in spaced relation to said edge portion and along the opposite edge portion with said dies and then moving the edges of said portions toward each other by bending the plate intermediate said portions with said dies while freely supported by said one die at opposite sides of said female surface.

7. The method of forming a tube consisting in bending plate at a portion adjacent one edge thereof between relatively movable coacting male and female surfaces while

said portion is freely supported by one of the dies at opposite sides of the female surface, moving the plate across said surfaces and bending the plate along the portion thereof adjacent the other edge by means of said surfaces while freely supported by said one die at opposite sides of the female surface, returning the plate across said surfaces toward initial position, and then moving the free edges of the portions of the plate toward each other, through bending of the portion of said plate between said portions with said surface while freely supported by said one die at opposite sides of said female surface.

8. The method of forming a tube consisting in bending plate at a portion adjacent one edge thereof between an upper die having an arcuate male surface and suspended by a relatively narrow web rigid therewith and a female surface of a lower die movable relatively to the first die, moving the plate across said surfaces and bending the plate along the portion thereof adjacent the other edge by means of said surfaces while freely supported by said one die at opposite sides of the female surface, returning the plate across said surfaces toward initial position, and then moving the free edges of the portions of the plate toward each other through bending of the portion of said plate between said portions with said surfaces, while freely supported by said one die at opposite sides of said female surface and in removing the formed tube from said male die.

10. The method of forming a tube consisting in bending plate at a portion adjacent one edge thereof between relatively movable coacting male and female surfaces while said portion is freely supported by one of the dies at opposite sides of the female surface, moving the plate across said surfaces and bending the plate along the portion thereof adjacent the other edge by means of said surfaces while freely supported by said one die at opposite sides of the female surface, returning the plate across said surfaces toward initial position, then moving the free edges of the portions of the plate toward each other through bending

of the portion of said plate between said portions
6 with said surfaces while freely supported by said
one die at opposite sides of said female surface in contacting said edges, and in closing the tube along said edges to form a pipe.

11. The method of forming a tube consisting in bending plate at a portion adjacent one edge thereof between an upper die having an arcuate male surface and suspended by a relatively narrow web rigid therewith and a female surface of a lower die movable relatively to the first die, moving the plate across said surfaces and bending the plate along the portion thereof adjacent the other edge by means of said surfaces, returning the plate across said surfaces toward initial position, then moving the free edges of the portions of the plate toward each other through bending of the portion of said plate between said portions with said surfaces while freely supported by said one die at opposite sides of said female surface, and in welding said edges together to form a pipe.

12. The method of forming a tube consisting in bending plate at a portion adjacent one edge thereof between an upper die having an arcuate male surface of approximately 120° and suspended by a relatively narrow web rigid therewith and a female surface of a lower die movable relatively to the first die while said portion is freely supported by one of the dies at opposite sides of the female surface, moving the plate across said surfaces and bending the plate along the portion thereof adjacent the other edge by means
of said surfaces, while being freely supported by said
7 one die at opposite sides of the female surface, re-
turning the plate across said surfaces toward initial position, then moving the free edges of the portions of the plate toward each other through bending of the portion of said plate between said portions with said surfaces while freely supported by said one die at opposite sides of said female surface, in contacting said edges, and in welding said edges together to form pipe.

(8) During the prosecution of said application Serial No. 3971 said claims were rejected, and the rejection made final on the ground that the claims were unpatentable over the United States patent to Baker, 1,852,101, issued April 5, 1932, the Primary Examiner before final rejection also noting that it was common practice to connect the edge of cylinders by a welding operation as disclosed in the U. S. patent to Richter, 1,831,033, issued November 10, 1931.

(9) A claim numbered 6 was also finally rejected by the Primary Examiner on the ground that it was indefinite.

(10) After the final action by the Primary Examiner, plaintiff appealed Ex parte to the Board of Appeals of the Patent Office, cancelling claim 6, and the Board of Appeals dismissed the appeal as to claim 6 and affirmed the Primary Examiner as to said reproduced claims 1, 3, 4, 5, 7, 8, 10, 11 and 12.

(11) Thereafter, plaintiff petitioned the Board of Appeals for reconsideration of its said affirmation and in response to which the Board of Appeals reiterated its affirmation of the decision of the Primary Examiner.

8 (12) No appeal to the U. S. Court of Customs and Patent Appeals has been taken from the decision of the Board of Appeals affirming the action of the Primary Examiner in denying any claims to plaintiff herein.

Wherefore, Plaintiff brings this action under and in accordance with the provisions of the statute aforesaid, and prays the Honorable Court:

> (A) To order, adjudge and decree that claims 1, 3, 4, 5, 7, 8, 10, 11 and 12 of application for patent, Serial No. 3971 are patentable, and to further order, adjudge and decree and pursuant thereto to authorize the Commissioner of Patents, defendant herein, to allow said claims to plaintiff.

(B) Plaintiff further prays the Honorable Court for such other and further relief as the Honorable Court may deem just and proper.

Emmor H. Millard,

By Melville E. Jones,
Attorney for Plaintiff,
1029 Warner Bldg.,
Washington 4, D. C.

* * * * * * * * * *

9 Filed May 5, 1951

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Answer to the Complaint

To the Honorable the Judges of the United States District Court for the District of Columbia.

1, 2, 3. Defendant admits the allegations of paragraphs 1, 2 and 3 of the complaint.

4. He denies the allegation of paragraph 4.

5. He denies that the plaintiff is the original, first, and sole inventor or that he is entitled to a patent as alleged in paragraph 5. He admits the remaining allegations of that paragraph.

6, 7, 8, 9, 10, 11, 12. He admits the allegations of paragraphs 6 to 12, inclusive.

10 Further Answering, defendant states that the plaintiff is not entitled to a patent containing any of the claims set forth in the complaint for the reasons given and in view of the references cited in the final rejection of the plaintiff's claims by the Examiner, in the Examiner's reply to the plaintiff's brief and in the decision of the Board of Appeals, and in view of the following additional patent:

Minshull	977,118

Profert of copies of said final rejection, reply to brief, decision, references, and additional patent is hereby made.

Respectfully submitted,

E. L. Reynolds,
Solicitor, U. S. Patent Office,
Attorney for Defendant.

* * * * * * * * * *

11 Filed July 27, 1952

* * * * * * * * * *

Memorandum

The Court finds that the plaintiff's application fails to disclose any invention over the prior art. Counsel for the defendant will prepare the appropriate findings of fact, conclusions of law and the judgment.

Edward M. Curran,
Judge.

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12 Filed August 7, 1952

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Findings of Fact

1. This is an action under R. S. 4915 (U. S. C., title 35, sec. 63) in which the plaintiff, Emmor H. Millard, sought to have the Court authorize the issuance of a patent containing claims 1, 3, 4, 5, 7, 8, 10, 11, and 12 of his application No. 3971 for patent on a method of forming tubes or pipe.

2. The application here involved discloses a method of making tubes from flat metal sheets by the use of a concave lower die having a cavity corresponding to about 120 degrees of the completed tube; and a substantially cylindrical upper die. In making a tube, one edge of a flat sheet is laid across the cavity and shaped by means of the
13 upper die. The upper die is then raised and the

sheet is passed under it until the other edge lies over the cavity, whereupon the shaping operation is repeated. The upper die is then raised again and the middle section of the sheet is placed over the cavity and shaped, thus forming a tube. The tube is then removed from the die and completed by welding the seam. The cylindrical upper die is supported from the supporting bar by an integral web.

3. The patent to Baker No. 1,852,101 discloses a method of making tubes from metal sheets by the use of upper and lower dies having substantially the shape of those employed by the plaintiff. The tube is formed from the sheet by pressing the edges successively, and then the middle, in the same manner as in the plaintiff's process. The patent does not expressly state how the sheet is moved from one position to another between the dies, nor does it describe the welding of the seam. The upper die is separated from the supporting bar by a web which is not integral with the die but bears against it.

4. The patent to Minshull No. 977,118 shows a tube-forming apparatus in which a generally cylindrical upper die is supported from the bar by means of an integral web.

14 5. The patent to Richter No. 1,831,033 discloses the welding of a seam to form a tube.

6. It would be obvious in the method of the Baker patent, to move the sheet from one edge-forming position to the other by passing it under the upper die.

7. Whether the upper die is made integral with the web as in the plaintiff's device, or is clamped against it as in Baker's, is a matter of mechanical design which does not involve invention.

8. The provision of work supporting surfaces at the sides of the lower die of Baker would be an obvious and non-inventive mechanical expedient.

9. The claims here involved define no invention over the prior art.

10. The claims here involved are unpatentable in view of the prior art.

CONCLUSIONS OF LAW

1. The plaintiff is not entitled to a patent containing any of claims 1, 3, 4, 5, 7, 8, 10, 11, and 12 of his application here involved.

2. The complaint should be dismissed as to all the claims involved.

EDWARD M. CURRAN,
Judge.

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15 Filed August 7, 1952

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Judgment

This action came on to be heard at this term and thereupon, upon consideration thereof, it is this 7th day of Aug., 1952,

ADJUDGED that the complaint be and it is hereby dismissed, with costs against the plaintiff.

EDWARD M. CURRAN,
Judge.

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16 Notice of Appeal to Court of Appeals Under Rule 73 (B)

Notice is hereby given that Emmor H. Millard, plaintiff above-named, hereby appeals to the United States Court of Appeals for the District of Columbia Circuit from the final judgment entered in this action on August 7, 1952.

M. E. JONES,
(Attorney for Plaintiff),
(Emmor H. Millard),

MELVILLE E. JONES,
1029 Warner Bldg.,
Wash. 4, D. C.,
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EXCERPTS FROM TESTIMONY AND PROCEEDINGS

2 **Leslie C. Bradburn**

being first duly sworn by the Notary Public, testified as follows:

Direct examination.

By Mr. Jones:

Q.1 Please state your name, age, residence and occupation. A. Leslie C. Bradburn, 1801 Davis Avenue, Pittsburgh. My age is thirty-nine and I am a Process Service Representative of the Linde Air Products Company.

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A. I am a Service Representative for the Linde Air Products Company and we have an electric welding process called "Unionmelt", with which we join together tubular sections after being formed into pipe. We are sent out on these jobs at the request of the customer—Mr. Millard in this case—to assist them in establishing manufacturing practices to use our process.

In forming these tubular sections, of course it is necessary that they are a specific diameter and the edges are parallel in order that we get the best results from welding.

Q.3 Will you name some of the places in which you have been employed or performed services as trouble
3 shooter from time to time along the lines that you
have mentioned? A. I have been at Bethlehem Steel, at Leetsdale, on the welding of pin stock which is pipe for carrying water down from the mountains and mountainous sections. At Fort Pitt Bridge Works, work on plates, Isherwood plates, and also at Fort Pitt Bridge Works on the welding of surface casing pipe which they were manufacturing at that time. I have been at the National Tube Company, National Works, McKeesport, on large diameter gas transmission lines which were electric welded. I have been in the California plants of Consolidated Western Steel on the welding of gas transmission pipe lines. Is that sufficient?

* * *

Q.5 You might mention some of the companies for which you performed that work. A. Well, American Bridge Company, Dravo Corporation, National Annealing Box Company, Washington; Struthers Wells Corporation, Titusville; Chicago Bridge and Iron, Greenville, Pennsylvania; Railroad Car Manufacturing at Bethlehem Steel in Johnstown; Greenville Steel and Car, in Greenville, Pennsylvania; and mill work, all the mills in the Pittsburgh area, I mean the U. S. Steel mills and J. & L.

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4 Q.9 Will you tell us, if you know, what is meant by continuous or line production of pipe, of metal pipe? A. My conception of continuous forming of metal pipe is where you feed sheets of plate into a press and form a cylinder and progressively follow that cylinder with other sheets. That is continuous operation.

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5 Q.12 Can the Baker—the invention of the Baker patent be used for the continuous line production of pipe? A. From my reading of the Baker patent, I would say No.

Q.13 Why do you reach that opinion? A. Well, from reading the patent it is necessary to open the press after a cylinder is formed—that's the staybar or strongback.

Q.14 Here is a copy of that if you want it. A. In the Millard patent, in the preforming of the edges to form the top radius of the pipe the plate was moved laterally across the dies; whereas, in the Baker patent it shows the plate moving in two different directions, in Figure 4 and Figure 5.

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Q.16 Do you find any descriptive matter in the Baker patent showing how or in what directions the plate is moved to place it in the position of Figure 4, then in the position of Figure 5 and then in the position of Figure 6?

A. No, there is no description whatsoever in the Baker patent.

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6 Q.18 You will note in Figures 4 and 5 of the Baker patent arrows pointing in opposite directions. From your experience in the art have these arrows any significance or meaning to you, and if so, what? A. The only significance these arrows have to me in these referred to figures is the fact that the sheet in Figure 4 is put into the press and the top die is brought down, which performs one edge of the sheet, and according to Figure 5, the arrow pointing in the opposite direction, the sheet must have been removed from the press, rotated 180 degrees and put back into the die prior to making the forming in the cylinder in the Figure 6.

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7 Q.23 What is the advantage of free support of the plate in the Millard process on the female die 15 for each of the pressing operations? A. The advantage of the plate being free on the female die on the Millard patent is so that the plate can be removed to a different location mark before preforming edges. This is a necessity as the pipe is fed into a welding mill after forming into a cylinder. If these edges are not parallel the pipe will try to spiral and cause difficulty in the joining of the two edges.

Q.24 What you refer to as spiral, is it avoided in the Baker machine in producing pipe? A. According to the Baker patent and my reading of it, no.

Q.25 Why do you draw that conclusion? A. In his drawings of his female die he has a very short section at the top where you couldn't locate a plate; and, No. 2, if he suspends the sheet with cranes holding the plate while it is in the die before pressing, when the top die would come down your hoists would be of no advantage whatsoever to you.

Q.26 What happens to the plate in the Millard process as the Dies 15 and 19 separate, say, in the positions where the

8 dies—no, separate from the positions shown in Figures 3 and 5? A. In Figure 3 after preforming the edge and raising the top die 19, the plate is lowered to a parallel plane with die 15. It is then shifted laterally across the die, the female die—that was Figure 5, Mr. Jones?

Q. Yes, that's right. A. (Continuing) —until it is brought to a location mark, and the die 19 is then brought down on the sheet, which forms the other edge.

Q.27 Well, when the pipe is brought down, that is, when the plate is brought down from the positions of Figures 3 and 5 to a horizontal position, the action is by gravity alone, is it not? A. That's right.

Q.28 That is bound to be inherent in the Millard process, as disclosed in the drawings and specifications? A. That is right.

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9 A. Well, in that lateral movement, with the pressures exerted I think the die would tend to flex in a forty-foot length, thus causing a non-parallel edge.

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Q.33 Yes. Have you any knowledge of the Baker machine ever having been used in commerce or even having actually been built or operated? A. No.

Q.34 In the Examiner's reply to Applicant's brief in the record before the Patent Office, on Page 4 thereof it is stated:

> "Moreover, it would be an obvious expedient in bending large heavy sheets by means of a device, as disclosed by Baker, to provide the female die with laterally extending work-supporting portions, and to effect the bending with the work supported on such portions."

With the background of your actual experience and knowledge in the art, do you regard the quoted statement as true? A. I do not. In all of my experience I have never seen in the forming of pipe a floating top die such as this ram here. All top dies I have ever observed have been rigid.

Q.35 If the quoted feature stated by the Examiner to be
obvious were not employed, what would prevent the
10 plate in the Millard invention from producing spiral
or uneven free edges? A. What would prevent it?

Q. Yes. A. Well, it would be prevented in the Millard patent, to my knowledge, from spiral due to the fact that you have square edges on the plate moved to a definite location on the press and when the top engages the plate, the plate of course has to move into the female die and produce a parallel edge for the length of the sheet being formed.

Q.36 Do you regard the manufacture of pipe from plate according to the Millard method as accomplishing a new result, namely, the avoidance of spiral or uneven free edges in the manufacture of tubes or pipe? A. Yes.

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12 Q.43 Have you actually shaped plates with dies as shown in Figure 2 of the Minshull patent? A. Fort Pitt Bridge has attempted to form pipe in that manner, yes.

Q.44 What were the results? A. Unsatisfactory; they didn't get a round piece of pipe in the end.

Q.45 Did they initially get true arcs at the opposite edges of the plate? A. No.

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13 Q.51 Do you find in either Baker, Richter or Minshull the step of moving the plate laterally while in the machine and across the die surfaces, pressing an edge portion to position and pressing the opposite edge portion, followed by return lateral movement in the edge and across the die surface to the position of Figure 6 for final pressing? A. No.

Mr. Jones: Your witness, Mr. Reynolds.

Cross-examination.

By Mr. Reynolds:

Q.52 Did you testify that it wouldn't be possible to move the work longitudinally through the Baker device? A. Yes.

14 Q.53 Why is that? A. Due to his way of loading and unloading his press, swinging open these gates in Figures 3 and 8.

Q.54 Will you explain how that would prevent moving the work in endwise? A. Well, as I understand the patent, it is necessary for him to open his dies from the side.

Q.55 Well, the part D is raised and lowered with respect to the anvil A, isn't it? A. Part B?

Q. Part D. A. Yes.

Q.56 And when that is raised, wouldn't it be possible to insert the work longitudinally under it? A. He doesn't describe that in his patent.

Q.57 I am not asking you what he does, but I am asking you if that isn't possible? A. I don't know that.

Q.58 Do you see any reason why it wouldn't be possible? A. I have never seen this press and I wouldn't know.

Q.59 Well, you have seen the patent, haven't you? A. Yes.

Q.60 And you have testified how it works? A. Yes.

Q.61 Do you understand the operation of it? A. I understand the operation, yes.

15 Q.61 Then do you see any reason why you couldn't feed the work into it longitudinal? A. It's possible.

Q.62 All right. Now, as far as actually forming the metal is concerned, does it make any difference how the metal was fed into the press? A. For production purposes it would.

Q.63 Well, I mean just as far as the actual effect of the metal on the dies is concerned, does it make any difference how the metal got into the press? A. No.

Q.64 In other words, this way of feeding is simply a convenient production method, is that right? A. That is right.

Q.65 Now, referring to Figures 4, 5 and 6 of Baker, how do you think the work is moved from one position to another in those figures? A. How do I think it is moved?

Q. Yes. A. According to his drawings, he brings the plate in and forms the radius as shown in Figure 4. He then has to open his dies, remove the plate, he rotates it 180 degrees and forms the second radius in Figure 5.

Q.66 Well, why would you have to rotate it 180 degrees?
Why couldn't you simply slip it through in the direc-
16 tion of the arrows? A. He doesn't show that. The
direction of the arrows is the only thing he has on
there to show the work has been moved.

Q.67 Is there any reason why you couldn't pass the work— A. (Interposing) There isn't any reason why he couldn't have moved it laterally, no.

Q.68 And, as a matter of fact, that would be the most obvious way to move it, wouldn't it? A. That is correct, but he does not show it.

Q.69 Now, you testified that you have never seen this machine in operation? A. No, sir.

Q.70 As I understand it, you were asked if you thought it would be obvious to add lateral work supports, and you said it would not be obvious, is that right? A. That's right.

Q.71 Why wouldn't it be obvious? A. I also said I have never experienced or observed a floating top die.

Q.72 This question has nothing to do with the floating top die but simply whether it would be obvious to add lateral work supports. A. What would be the advantage of the lateral top work supports?

Q.73 Well, I suppose to support the work. A. In other words, with the top lateral support moving it will also move the sheet?

17 Q.74 Well, the die member A of Baker doesn't
move, does it? A. You have lateral movement on
that top ram.

Q.75 Well, I am talking now about the lower member A. A. That is the anvil. The anvil, no.

Q.76 The question is: Why wouldn't it be obvious to provide lateral work supports on that anvil A of Baker? A. Why wouldn't it be?

Q. Yes. A. Due to the fact that he doesn't show enough area on top, on the top part of his die. He has a very narrow female die. How could you have lateral movement, according to his sketch?

Q.77 I am not talking about movement but about work supports. Can't you imagine putting work supports extending laterally from the anvil A of Baker? A. Oh, yes.

Q.78 And, as a matter of fact, that type of work support is common on dies? A. Yes.

Q.79 Then wouldn't it be obvious to put them on Baker's member A if he wanted to? A. It would be, but he didn't do it.

Mr. Reynolds: All right, sir, that is all.

Redirect examination.

By Mr. Jones:

Q.80 According to the Baker machine, would there
18 be any reason or function for putting lateral die supports on the Die A? A. Not to my knowledge. If he had enough of a female die in A there would be no need for lateral work supports, as in the Millard patent.

Q.81 You have referred to the lateral sliding movement of the strut 1 with respect to the Die D. Does or *D*oes not that preclude any functionality for providing lateral die supports on Die A? A. The only thing I see in moving the strut 1 on Die D would cause the plate to move laterally, according to the position of the die, into the female die.

Q.82 At the present time, after having seen the Millard invention as disclosed in the pending Application and in actual practice, what might appear obvious at this time could you say that it would have been obvious back at the time of the Baker patent? A. Would it have been obvious?

Q.83 For instance, the possibility of providing merely lateral supports on the Die A of Baker. A. It would have been back in '32, yes.

Q.84 It would have been obvious to provide those lateral die supports at that date? A. No. You mean——

Q.85 At the time of Baker. I mean at the time of the Baker invention. A. I don't think it would have been.

19 Q.86 Has Baker any means for catching the plate as it lowers to the horizontal upon separating Dies A and D? A. No, other than overhead crane service. There is no place for the plate to rest on the anvil in the Baker patent.

Q.87 Then would there be any reason for providing supports such as are used in the Millard invention? A. It would be a necessity.

Q.88 Now, are you talking about the necessity in the Baker invention or in the Millard invention? A. It would be a necessity in the Baker invention, to provide the additional work supports Mr. Reynolds asked about, whereas it is not necessary in the Millard patent.

Q.89 I wonder if we are talking about the same thing. Now, in the Millard invention the female die is laterally extended on opposite sides of the groove and provide the supports, as I understand. Is that correct? A. That's correct.

Q.90 Are such supports shown in the Baker invention? A. No, sir.

Q.91 If I am correct, Baker operates without such supports? A. That is correct.

Q.92 Then how would it be obvious to provide them in Baker, or how could it be obvious to provide them in Baker? A. The only support Baker could have would be crane service, according to his patent drawings, to
20 hold the plate while he is doing what Mr. Millard's patent was doing.

Q.93 Well, you have stated that with the Baker operation you will obtain spiral edges at the free edges of the pipe? A. Yes, sir.

Q.94 And by reason of the particular support and shape of the female die in the Millard invention you get the new result of avoiding the provision of those spiral edges? A. Yes, sir.

Q.95 In the Baker patent, in the paragraphs starting on Page 2, Line 63 of Column 1 and ending in Line 73 of the second column on that page, it is stated:

> "Whenever a piece of work is being removed from the machine the hammer 6 supports the delivery end of the die, but while the work is being shaped by the Die D the working load in transmitted from the cross-head to the die by means of a keeper 8 and 9 made so as to be opened and closed. This die keeper is adapted when closed to operatively grasp an end of the Die D, and when opened is adapted to release the die and swing out of the way to afford passage for the finished work during its removal from the die."

Do you find anything in Baker showing that it is possible to operate that machine with the die keepers 8 and 9 in open position? A. No.

21 Mr. Jones: That is all.

Recross-examination.

By Mr. Reynolds:

Q.96 Disregarding any question of how the metal gets into the die, what difference is there, if any, in the actual action of the die on the metal between the Baker patent and the Millard application? A. You mean in forming the edges, Mr. Reynolds?

Q.97 In forming the metal from a flat sheet into a tube. A. Well, the primary difference, as I have contended here, is that it is necessary to have a definite location, as was done in the Millard patent on the parallel edge, in order to keep the edges parallel when you come down and form your tube. With the Baker patent and no support whatsoever on anvil A, there is no definite location as to the sheet with regard to the female die.

Q.98 He does show it in a definite location, doesn't he? A. I wouldn't agree. In Figure 2 in the Millard patent it definitely shows the plate laying across the female die. In Figure 4 of the Baker patent he shows the formed edge.

Q.99 In what position do you suppose that metal was before the die first acted on it in Figure 4? A. Before it acted on Figure 4?

Q. Yes. A. I wouldn't say.

22 Q.100 Well, it would have been laying across the anvil in a horizontal position, wouldn't it? A. To where?

Q. I am asking the questions. A. Well, I mean, with the narrow point on the top of the area, I don't know how he could support properly. He has no support in Figure 4 showing where the plate is resting anywhere other than by means of a crane.

Q.101 Now, if you had trouble in getting it in position, it would be obvious to put a support under it, wouldn't it? A. Definitely. Under it or over it.

Mr. Reynolds: That's all.

Redirect examination.

By Mr. Jones:

Q.102 But in the Baker patent there is no means shown whereby the spiraling of the edges of the plate is or can be avoided, is there? A. No, sir.

Q.103 And is there any hint that such a feature should be avoided? A. No.

Mr. Jones: That is all.

Mr. Reynolds: That is all.

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23 **George Hutchinson**

being first duly sworn by the Notary Public, testified as follows:

Direct examination.

By Mr. Jones:

Q.1 Please state your name, age, residence and occupation. A. George Hutchinson, 215 Orchard Avenue, Canonsburg; age 51, employed as Master Mechanic, Fort Pitt Bridge Works.

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Q.3 What experience have you had in connection with the forming or pressing of metal plate or in connection with pressing operations generally? A. I have been employed there twenty-three years, with various pressing operations in my capacity there as Master Mechanic since '36. We have done considerable pressing of plates in various forms.

Q.4 Are you familiar with the invention disclosed in the Millard application for U. S. Patent Serial No. 3971 involved in this suit? A. Yes.

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24 Q.8 Will you tell us, if you know, what is meant by continuous or line production of pipe? A. I take it continuous production of pipe is taking the sheet, preforming it into a tubular section, and continuing on into the further operations with welding.

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Q.12 Can the Baker disclosure be used for the
25 continuous or line production of pipe? A. As I
interpret this drawing, no. Can I enlarge on that?

Q. Certainly, go ahead. A. As I read these drawings, the Baker is a posted press and the width of that press is not sufficient to allow the plate to go in the press endways; it has got to be fed in sideways. Besides which the locks engaging the top die seem to prohibit entry of the plate from the end.

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26 Q.17 Have you actually seen pipe formed by the Millard invention which is longer than the dies which formed it? A. Yes.

Q.18 That pipe was actually formed according to the Millard invention? A. Yes. It is possible to form tube longer than the top dies, and has been done.

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27 Q.22 What is the advantage of free support of the plate in the Millard process on the female Die 15 for each pressing operation? A. It is very necessary to locate the plate at a predetermined distance from the edge of the groove to insure that the plate, when it is formed, will give two perfectly parallel surfaces preparatory to the welding operation.

Q.23 Would you say that it is inherent in the Millard invention that as the Dies 15 and 19 separate from the positions of Figures 3 and 4 for the plate to lower onto those dies? A. Yes, it has got to return in the second position to a predetermined location.

Q.24 Can you comment on the practicability of the lateral sliding of strut 1 in Baker on the upper surface 2 of Die D in Baker? A. In our experience it is absolutely necessary for the top die to be rigid and strong enough to take the tremendous pressure necessary to form the pipe. Any sliding or any movement of the top die whatsoever would cause a deflection in the operation, in my opinion.

Q.25 Have you any knowledge of the Baker machine ever having been used in commerce or even having actually been built? A. I have no knowledge of it whatsoever. May I comment on the formation, on the shape of the female die?

28 Q. Certainly. A. It is necessary for that die to have a flat surface on the top so that we can insert tool steel edges to allow the plate to slide into the groove, which is precluded in the Baker patent, as I read it.

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31 Q.42 Do you find in either the Baker, Richter or Minshull patents the step of moving the plate laterally while in the machine and across the die surfaces after pressing an edge portion to position and pressing the opposite edge portion followed by a return lateral movement

in the machine and across the die house to the position of Figure 6 for final pressing? A. I can't see any indication on these drawings of any such movement.

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Cross-examination.

By Mr. Reynolds:

Q.43 It is common, broadly, to feed a sheet longitudinally through a die, isn't it? A. Never having seen a pipe formed in this manner, I don't know.

Q.44 That is, you have never seen an arrangement
32 in which the sheet was fed longitudinally to the
dies which formed it into tube? A. Not into pipe, no.

Q.45 Now, in the Baker device you said that it would not be possible to feed the tube longitudinally because the end posts would interfere with it, is that right? A. The sheet?

Q.46 The sheet, yes. Those posts could be moved far enough apart so that the sheets could be fed through, couldn't they? A. Yes, they could.

Q.47 You also said, I believe, that the members 8 and 9 might interfere with the longitudinal feed, is that right? A. I said that, Yes.

Q.48 Will you explain how they would interfere with it? A. I'll have to take that back. Let's get this straight. The locking devices, as I interpret this drawing, prohibit the plate from being moved without moving the locking devices. That's what I was trying to say.

Q.49 But they wouldn't prevent it from being fed longitudinally? A. I must admit they wouldn't.

Q.50 So then as far as you see now, the only reason it couldn't be fed longitudinally is that the posts would interfere and if the posts were separated it would be possible to feed longitudinally, is that right? A. That's right.

Q.51 Now, referring to Figures 4 and 5 of Baker,
33 I believe you said that as you understand his dis-
closure, he takes the sheet out and turns it around
and then puts it in from the other side of the die, is that right? A. That's right.

Q.52 Well, now, it would be perfectly obvious instead of doing that, simply to move the sheet through the dies, wouldn't it? A. Well, all I could go by was the drawings, the information shown on this sketch. In answer to your question, well, it could be moved laterally.

Q.53 That would really be the most obvious way of moving it, wouldn't it? A. Well, I don't know. The reason I bring this out, we have in our press the means to support that plate by the width and the platen on the press body. Here he is supporting his plate by an overhead crane. Now, are you assuming he would move the crane at the same time as the press?

Q.54 Let's put it this way: Supposing you showed one of your mechanics the metal in the position of Figure 4 and asked him to put it into the position of Figure 5, how would he do it? A. He would have to make provision to hold that plate up, of course, hold that plate up by cranes on the other side, which I suppose he would do. It would probably go through as you said.

Q.55 Now you said that you didn't think Baker could produce unspiral pipe. Will you explain that a little,
please? A. That sharp edge of the die, as shown in
34 this sketch, would have to support for that edge of
the plate and when the top die came down—you've got to have a support for the plate to rest on previous to the bending. This, with the sharp edge of the female die, there would be tendency for that plate to slip one end ahead of the other.

Q.56 Well, now, suppose you provided lateral supports on the Die A, would that overcome that difficulty? A. By inherently changing his dies, yes. But, as was pointed out, these tool steel inserts on the design of the die is an inherent part of the design of that die.

Q.57 Well, but suppose he did have a lateral support on his die, would that overcome this difficulty of spiraling? A. Well, all the testimony I have given, of course, is that this die here wouldn't accomplish that. If he redesigned his dies with that support incorporated, then it is logical to assume that it would do the job.

Q.58 Well, supposing you didn't redesign the die except by putting in a lateral support, would that overcome the difficulty or not? A. Well, again I must say Yes, it would overcome the difficulty if the support was strong enough and designed to take the terrific drag over the edge of that die.

Q.59 Well, you wouldn't put in any support that wouldn't
be strong enough, would you? A. Well, you would
35 have to be a mechanic, I suppose, to figure that out.

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Q.62 Well, now, as to any longitudinal feeding of the plate in Baker and subsequent stripping of the pipe produced from it, could that occur otherwise than by placing the plate on there, then backing the pipe off? I ask that question for the reason that the specifications state that the strong-back b has crosshead C at its ends carried upon suitable guide rods E and Die D carried by the crossheads. A. I don't get the question.

Q.63 Well, in other words, what I am getting at is
whether or not there can be continuous longitudinal
36 feed of the plate through the Baker machine rather
than feeding the plate longitudinally onto the machine and then backing it off. A. After the plate is formed in the Baker patent, it is necessary to open the locks to remove or strip the tube from the die. This is not necessary in the Millard patent; we have open end dies and after the pipe is formed, it is just stripped off in a continuous operation. Does that answer your question?

Q. Yes.

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E. H. Millard

being first duly sworn by the Notary Public, testified as follows:

Direct examination.

By Mr. Jones:

Q.1 Will you please state your name, age, residence and occupation? A. E. H. Millard, 78 years old, 1431 Washington Road, Mt. Lebanon, Pittsburgh 28, Pennsylvania.

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37 Q.3 What is your occupation, Mr. Millard? A. Well, I'm Works Manager and Director of the Fort Pitt Bridge Works.

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Q.5 How long have you been in that general line of work? A. Well, it dates back to 1903, as a Draftsman for the Riter-Conley Manufacturing Company of Pittsburgh, Pennsylvania, who were fabricators of plate and structural steel. I spent about six months in their drafting room and then was on the road as a construction engineer, erecting gas holders, gas furnaces, pipe lines, et cetera.

* * * * * * * * * *

38 Q.10 Have you actually formed pipe in accordance with the disclosure in that application, which will from now on be referred to simply as the Millard Invention? A. Yes.

Q.11 Where did such formation take place, and can you give us some idea of the extent of pipe manufactured? A. The pipe has been manufactured at the Fort Pitt Bridge Works' plant—I might say, their only plant, in Canonsburg, Pa. We have manufactured about 200,000 feet of 10¾ inch OD pipe, most of the lengths are 40-feet, and some under. The steel plates were ¼ and 5/16ths inches thick. The ends of the pipe have been bevelled for welding to go in the field and some of the industry have had collars put on for connecting together when used as surface casing pipe.

39 Q.12 What was the approximate weight of the plates from which the pipe mentioned by you has been made? A. Oh, between 11- and 1200 pounds.

* * * * * * * * * *

40 Q.16 Can the Baker disclosure be used for the continuous or line production of plate, in your opinion? A. Well, from the drawings of Baker, his plate is entered from the side of the press. The die, the male and female dies act to form the pipe. The first operation is shown in Figure 4. And it is placed sideways between the male and female dies, as indicated by the arrow. The second operation, as shown in Figure 5, the plate, as indicated by the arrow, has been turned 180 degrees horizontally and entered into the press or entered in between the male and female dies from the side. After this operation the plate is moved but how it is moved does not appear to be indicated. So the male and female dies act in the center to form a circular tube. Now, to remove this pipe or strip it off of the male die, it is necessary to throw Sections 8 and 9, shown in Figure 2, to one side, as indicated in Figure 8. This, of course, takes time, and in my opinion it is not a continuous operation. Putting a plate in the side of a press, then having to turn it around 180 degrees to continue forming it, and then after it is formed you have to swing open fixtures 8 and 9. So in this way I don't see where you could get line production or fast production.

Q.17 What is the advantage of free support of the
41 plate in your process on the female die for each of
the pressing operations? A. Well, the plate has to be supported, the plate has to be supported and has to be positioned exactly, and our way of doing it—and we have made a couple hundred thousand feet—the plate is held exact all through the various operations, first as shown in Figure 1 and Figure 3—wait a minute, that should be, first, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, don't have to be locked in Figure 7 because it is already formed there.

Q.18 What happens to the plate in your process as the Dies 15 and 19 separate from the position of Figures 3 and 5? A. Well, when the press is released, as shown in Figure 3, the plate falls over to its side because the weight of the plate, approximately two-thirds of the weight is on that side, and just by gravity it falls down. Then the plate is moved—it falls down on top of the female die—then the plate is moved and positioned exactly in the right position, in Figure 4. We have stops or guides and these put it right up there exactly. The reason that we have to locate it exactly in Figures 3 and 4, as well as in Figure 6, is that we have got to keep the edges of the plate parallel at all times, exactly parallel, and if they are not positioned correctly, when we operate the press, that's when the male die engages the female die, why, the plates have to be exactly straight.

Q.19 Can you comment on the practicability of the
42 lateral sliding movement of strut 1 on the upper
surface 2 of Die D——

* * * * * * * * * *

43 Q.25 Does your process form plate or form pipe without spiral or uneven free edges? A. Yes. That was very essential, that we make it that way, otherwise, we would have trouble running it through our welding machine, where the plate is welded by the Unionmelt process. So we had to hold it that way, we had to be very careful to form the plate and set these plates exact every time we would have a pressing operation.

Q.26 From your experience and knowledge of the art, can you say whether or not the Baker disclosure can produce pipe from plate without spiral or uneven free edges?

A. I wouldn't be able to say that at all, because
44 based on our experience, which was long before we
knew about the Baker patent, we knew we had to do certain things to hold that plate in absolutely and true position at all times. His idea, he wouldn't know how we would do it, but I know by experience if we didn't hold that plate exact for every pressing operation, we would be in trouble. We couldn't put it through the welding machine.

* * * * * * * * * *

47 Q.35 Then the steps, according to your method—

A. (Interposing) He don't follow the steps we follow in ours, because we don't take the plate out, turn it around 180 degrees and stick it back in. We take the plate right across and back.

Q.36 Has any Country granted you a patent on the same invention as is disclosed in your U. S. Application Serial No. 3971? A. Yes, we have a patent granted us by the—what do we call that?

Q. British Patent Office. A. British Patent Office, Patent No. 659307.

Q.37 That covers the identical invention as disclosed here?

* * * * * * * * * *

48 Cross-examination.

By Mr. Reynolds:

Q.38 The idea of feeding sheets longitudinally in forming tubes was old before you ever thought of your idea, wasn't it? A. You mean into a press?

Q. Yes, that's right. A. Oh, yes, yes. In other words, whether it is formed into pipe or something else, the plate would go through, in our type of press, the ends rather than from the side.

Q.39 I mean, you didn't originate that idea? A. Oh, no, no.

Q.40 Referring to Figures 4 and 5 of the Baker patent, you testified that in your opinion he takes the sheet out and turns it around between the positions of Figures 4 and 5, is that right? A. Well, I take it from those arrows that are on there, wouldn't you? I mean, that's our interpretation of it. In other words, there must have been some reason for them to put arrows there.

Q.41 Well, it would be obvious, would it not, that it could be moved through the press instead of— A. (Interposing) I don't know; there must have been some good reason. He did it that way or he wouldn't show it that way. I wouldn't say it is obvious he could do it, because why would he turn that plate around?

Q.42 Well, do you see anything that would prevent that? A. I don't know anything about that, I can't say that.

49 Q.43 I am asking you if you see anything that would prevent it. A. I don't know the construction of the machine. I know a plate can be moved, if there's no interference. But he must have had some interference there, or something, or he wouldn't be turning that plate around. No, I can't say it's obvious you could do it on that machine, because he's turning it around. I mean, anything can be moved. I can move anything across this table if there's nothing interfering with it.

Q.44 Well, can you point out why he can't do it? A. I can't point that out but there must be a reason. It's commonsense; that man isn't going to take that plate out, turn it around 180 degrees, and so on. There's some reason he can't do it on that machine.

Q.45 You can't point out any reason, though, why he can't do it? A. Well, I don't know what the machine is. All I can say is he couldn't do it or he wouldn't have those arrows there.

Q.46 Well, I just want a Yes or No answer. A. I'll tell you, I see no reason why we couldn't take a steel plate and move it back and forth across this table. Why he can't do it, I don't know, but there must be a reason or he wouldn't turn it around.

Q.47 But you don't know what the reason is? A. I don't know what the reason is, so I'll say I don't think he can do it on his machine. He must have some good reason for not doing it.

50 Q.48 But you, yourself, can't point out any reason why he can't do it? A. The only reason I can point out is what he shows in the drawings.

Q.49 What does he show in the drawing that would prevent him from doing it? A. Well, there must be something, I don't know, there must be something he don't show, because——

Mr. Jones: Off the record.

(Discussion off the record.)

Q.50 (By Mr. Reynolds) There is no structure shown there that would interfere with that sort of movement, is there? A. I don't know how much clearance he has there between his male and female dies. Maybe he hasn't got enough to pull that across like we have. You see, we have enough clearance there that after we form one edge then we can pull the whole thing across. But I don't know whether he's got enough clearance there.

Q.51 Look at Figure 2 of the patent which shows the die in the rested position, doesn't that show enough clearance? A. Well, I wouldn't know. That's not a drawing to scale. We don't know, we just assume those distances.

Q.52 What I am trying to get at, you can't put your finger on anything there that would prevent it, can you? A. No, but he evidently has or he wouldn't do all that extra work.

51 Q.53 Now, it is common to provide surfaces adjacent to dies for supporting work, isn't it? A. Oh, yes, yes, you've got to support your work, whether you do it on the table or an overhead crane. You don't hang it up on sky hooks, you know.

Q.54 Referring to Figure 4 of Baker, can you think of any reason why it wouldn't be obvious to provide such surfaces on the Die A? A. I don't know.

* * * * * * * * * *

Mr. Reynolds: Do you want to add something to your deposition, Mr. Bradburn?

Mr. Bradburn: Yes, sir.

Mr. Jones: We will just show that Mr. Bradburn is taking the stand of his own volition.

Leslie C. Bradburn.

having been previously duly sworn, testified further as follows:

The Witness: I want to say that in the present day in
the manufacture of large diameter tubular pipe if it were
possible to preform edges as shown in Figures 1 and
52 2 of the Minshull patent, it would be a practice today
by companies manufacturing transmission gas lines.

Edges on pipe today are either formed in press brake prior to rolling diameters or on edge-forming rolls prior to U-ing and O-ing.

* * * * * * * * * *

EXHIBITS

Patent Specification

This invention relates to the formation of tubes or pipe of any practical size from steel or other plate.

A prime aim is to provide a method for this purpose wherein a plate is pressed into tubular shape by the use of a single male die and and a single female die.

Another object is to attain the end stated through the advantageous use of minimum die requirements in a press, such as that disclosed in Letters Patent No. 2,419,724 issued April 29, 1947, jointly to Frederick R. Wilson and applicant.

A further object is to enable manufacture of tubes or pipe from plate by initially pressing the plate arcuately approximately 120° at one side portion, then arcuately pressing the plate with the same die means approximately 120° at the opposite side portion, and then arcuately pressing the plate centrally approximately 120° with the same die means.

Still further, an object is to produce pipe from the tube thus formed, by clamping the tube to contact or approximately contact the meeting edges and then with the tube in said condition, welding a seam therealong.

The invention consists in a method of making tube or pipe from steel or other plate which comprises bending the plate at a portion adjacent one edge thereof between relatively movable coacting male and female dies, bending the plate along the portion thereof adjacent the opposite edge by means of said dies, and then moving the bent portions of the plate toward each other by bending the portion of said plate between said bent portions with said dies, said female die being adapted to freely support said plate prior to each bending operation.

The invention also consists in a method of making tube or pipe from steel or other plate which comprises bending the plate at portion adjacent one edge thereof between relatively movable coacting male and female dies, moving the plate relatively to the dies and bending the plate along the portion thereof adjacent the opposite edge by means of said dies, returning the plate across the female die toward initial position, and then moving the bent portions of the plate toward each other by bending the portion of said plate between said bent portions with said dies, said female die being adapted to freely support said plate prior to each bending operation.

The invention also comprises apparatus for making tube or pipe according to the method.

Various additional objects and advantages will become apparent from a consideration of the description following taken in connection with the accompanying drawings illustrating an operative embodiment by way of example.

In the accompanying drawing:—

Fig. 1 is a view showing a press forming plate into a tube, the first pressing operation being shown in full lines, and the complete tube as a result of the final operation being suggested in dotted lines, press parts being conventional and shown partly in vertical transverse section and partly in elevation;

Figs. 2—7 inclusive, show successive steps in the manufacture of plate into tubing according to my invention, in connection with associated male and female dies;

Fig. 8 is a perspective view of a tube as removed from the press;

Fig. 9 is a perspective view illustrating a tube in connection with conventional welding equipment, the tube being shown as partly completed as pipe;

Fig. 10 is a perspective view of a completed pipe; and

Fig. 11 is an end elevation of a modified form of male die.

According to the invention and referring specifically to the drawings wherein like reference characters designate like or similar parts throughout the different views thereof, a rectangular flat plate such as steel plate as shown at 10 in Fig. 2 is formed or pressed into the tube 11 of Fig. 8 wherein the facing edges are very close together at 12, which edges are later moved toward each other and welded together at a seam 13, as in Figs. 9 and 10, producing a commercially round pipe.

In forming the tube 11, we employ but one male die 14 in combination with a single female die 15, at least one of which dies is vertically movable rectilinearly with respect to the other. Such dies for example are mounted in and operated by a press 16 (Fig. 1), as disclosed in the aforesaid British patent specification, dies 14 and 15 respectively being removably secured in any suitable manner to platens 17 and 18. Said platen 18 as shown is vertically movable rectilinearly and platen 17 is stationary, although the reverse may be true, or even both platens may be movable.

Said die 14 has a horizontal cylindrical head or body 19 suspended rigidly from an attaching bar 20 by a relatively thin neck or web 20. Such dies 14 and 15 extend the full length of the tube being formed, and each die is of the same respective cross-sectional configuration throughout its length.

The female die 15 has a central longitudinal depression or groove 21 in its upper surface in line with and below head 19, and lateral plane surfaces which freely support plate 10 prior to each of the bending operations hereinafter described.

The curved surfaces of head 19 and at groove 21 are slightly in excess of 120°.

The plate or blank 10 is rectangular and of the exact size to produce a finished tube and the outer surface of head 19 occupies the same arc as the desired inner wall of the tube being produced while the wall at groove 21 is on an arc concentric with the outer cylindrical surface of head 19 and on a radius only sufficiently larger to accommodate the thickness of plate 10 therebetween during the bending operations involved in manufacturing the tube 11.

In performing the instant method, the plate 10 is disposed on die 15 with one-third or a little more of its area transversely from the left hand edge aligned with head 19 and groove 21. With the plate suitably placed in this position, the dies 14 and 15 are operated relatively into the position of Fig. 3, whereby the mentioned area of the plate 10 is bent into an arcuate portion 22 of at least and slightly in excess of 120°.

Thereupon the dies 14 and 15 are separated and the plate 10 is shifted laterally across die 15 manually or otherwise into the position of Fig. 4, disposing approximately one-third or a little more of its area transversely from the right-hand edge into alignment between head 19 and groove 21. In this position, the plate is suitably placed and the dies 14 and 15 are moved relatively into the position of Fig. 5 whereby the last-mentioned area is bent into an arcuate portion 23 of at least and slightly in excess of 120°, as shown in Fig. 5.

The next step is to separate the dies 14 and 15 and manually or otherwise slide the plate laterally on die 15 back toward initial position and centered with respect to the dies as in Fig. 6. Thereupon the dies 14 and 15 are moved relatively into the position of Fig. 7, bending the central portion of the plate into the same arc as portions 22 and 23 and forming a round wall tube. In this condition, the tube is slidably removed or stripped longitudinally from the head 19, having the shape shown in Fig. 8.

As said Fig. 8 discloses, the meeting edges of the tube are slightly spaced at 12 to about the same width as the neck or web 20. With a view to producing a tube with the space 12 as narrow as practical, it is a desideratum to provide the web or neck 20 as narrow as is practical.

In making such tube into a complete pipe, the tube 11 is clamped to bring its longitudinal edges at slot 12 into contact and while thus clamped such edges are welded together along slot 12 into a seam 13.

While the said clamping of the meeting edges of the tube 12 may be effected by hand clamps or in any desired manner and the weld 13 effected by any suitable equipment, we have elected to show these operations as being performed in a suitable continuous longitudinal seam welding apparatus 24 in Fig. 9, it being clear that such apparatus 24 has mechanism which continuously moves the tube 11 therethrough, while shaping the tube if out of round for commercial pipe and contacting the meeting edges at slot 12, as well as by means of a conventional welding device 25, effecting the weld 13. Where hand clamps or other means are used in lieu of apparatus 24, to draw the tube edges together, it is to be understood that we may employ where desirable, any suitable apparatus to shape the tube or any part thereof to secure commercial roundness. It should be clear that weld 13 may be effected while the tube 11 is either moving or stationary and therefore we may elect after the tube 11 has been properly clamped and rounded to have the tube remain stationary and move the welding apparatus to effect weld 13.

Since the arcuate surfaces of the head 19 and at groove 21 are slightly in excess of 120°, in the pressing operation of Fig. 6, the portions 22 and 23 will be slightly and advantageously overlapped by the said arcuate surfaces in completing such operation.

The term "welding" is not used in a limited sense in this specification and its claims as it necessarily includes any type whether electrical or otherwise wherein there is fusion or other metal-uniting.

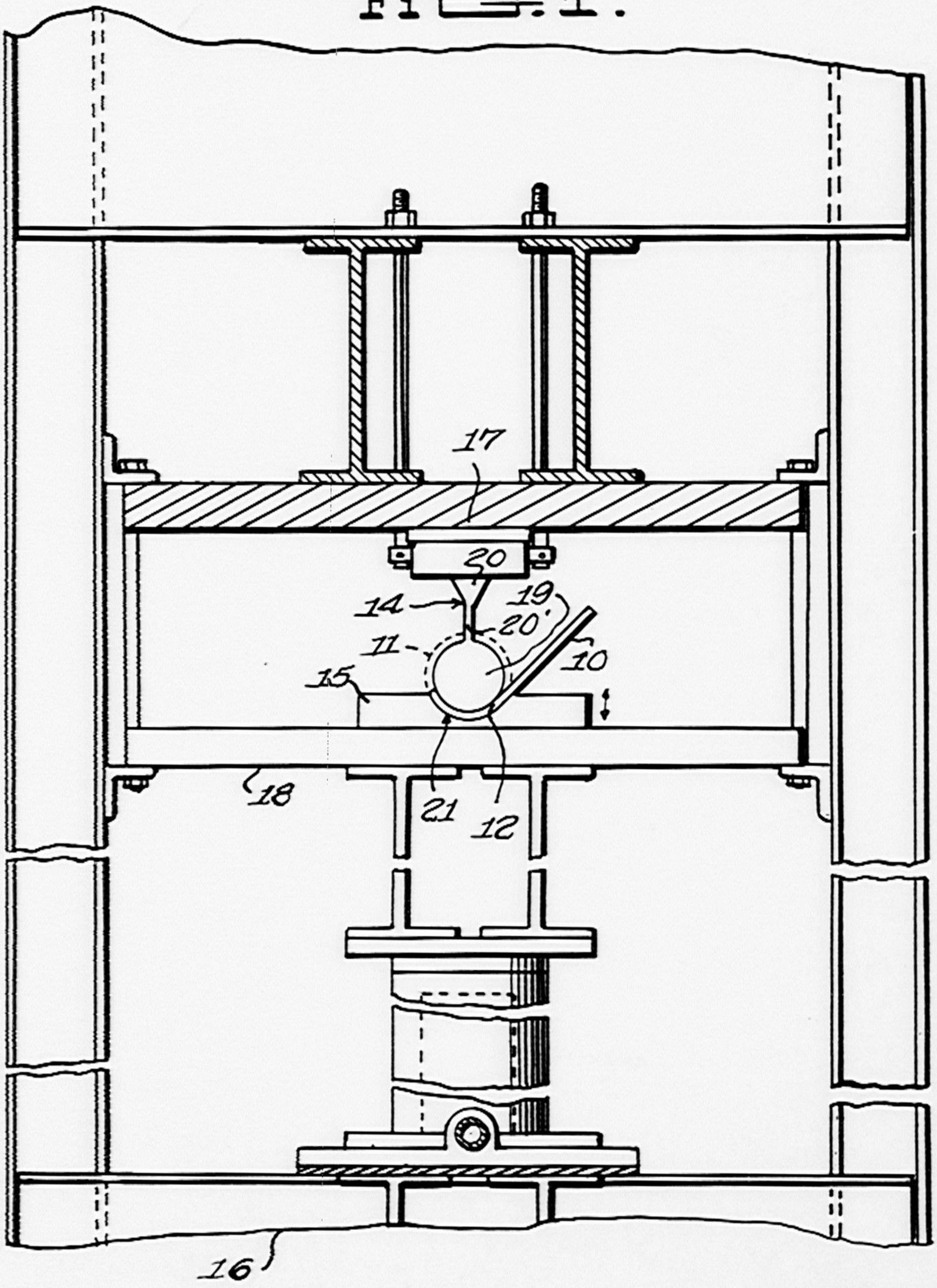
Attention is called to the fact that head 19 need have a cylindrical or arcuate surface extending slightly in excess of 120° rather than nearly a cylinder. Such a modified die is shown in Fig. 11, wherein the head is designated 19 and its arcuate surface 19*a*.

The invention is especially applicable to the manufacture of tubes or pipe of any practical diameter and length from plate of any appropriate gauge or thickness in accordance with the invention, depending on the radius used for producing head 19, the arc of the wall of groove 21 and thickness of plate 10, so that contact concentric relation of the surfaces of the head 19, the plate 10 and at the wall of groove 21 will exist at the completion of each pressing operation or step.

Various changes may be resorted to within the spirit and scope of the invention as defined by the appended claims.

* * * * * * * * * *

FIG. 1.



INVENTOR,
EMMOR H. MILLARD,
BY
his attorney.

FIG. 2.

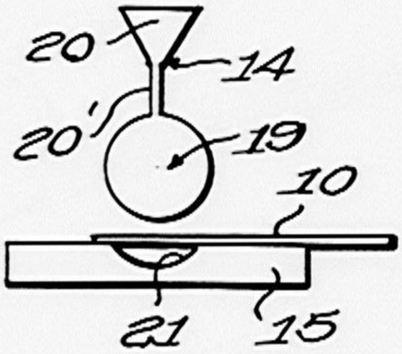


FIG. 5.

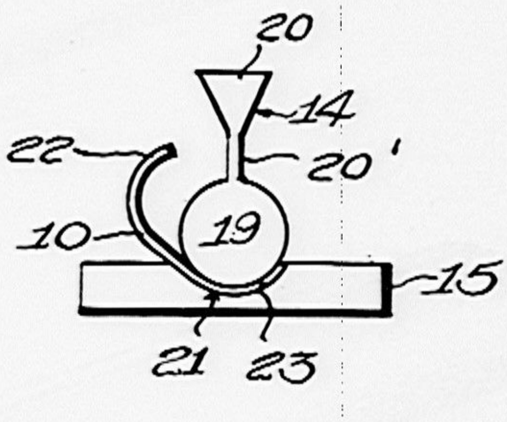


FIG. 3.

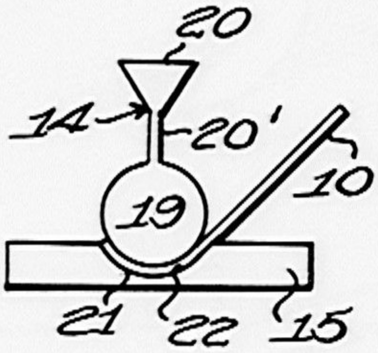


FIG. 6.

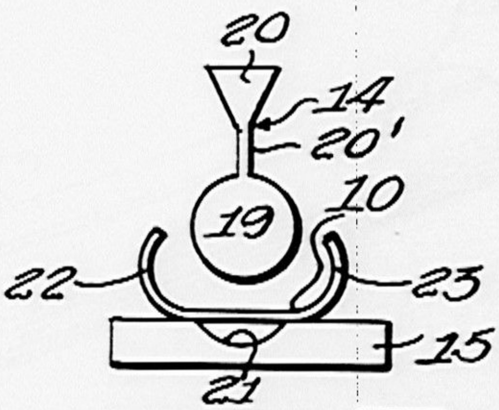


FIG. 4.

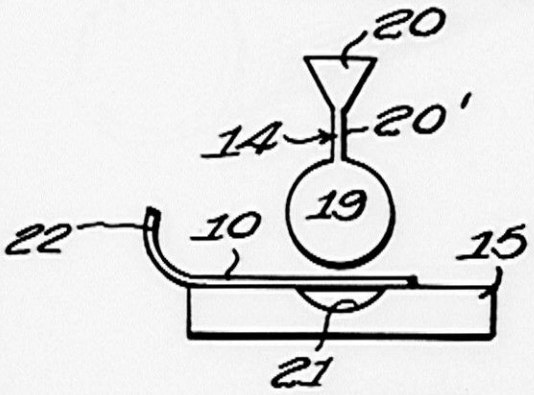
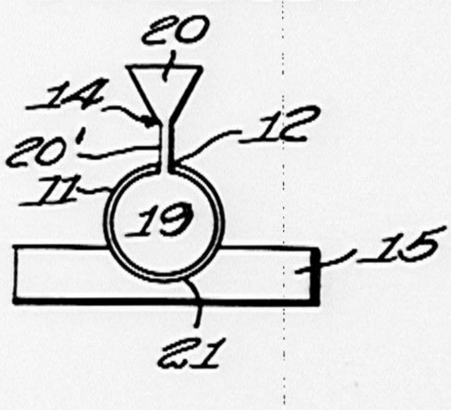


FIG. 7.



INVENTOR,
EMMOR H. MILLARD,

BY

his attorney.

FIG. 8.

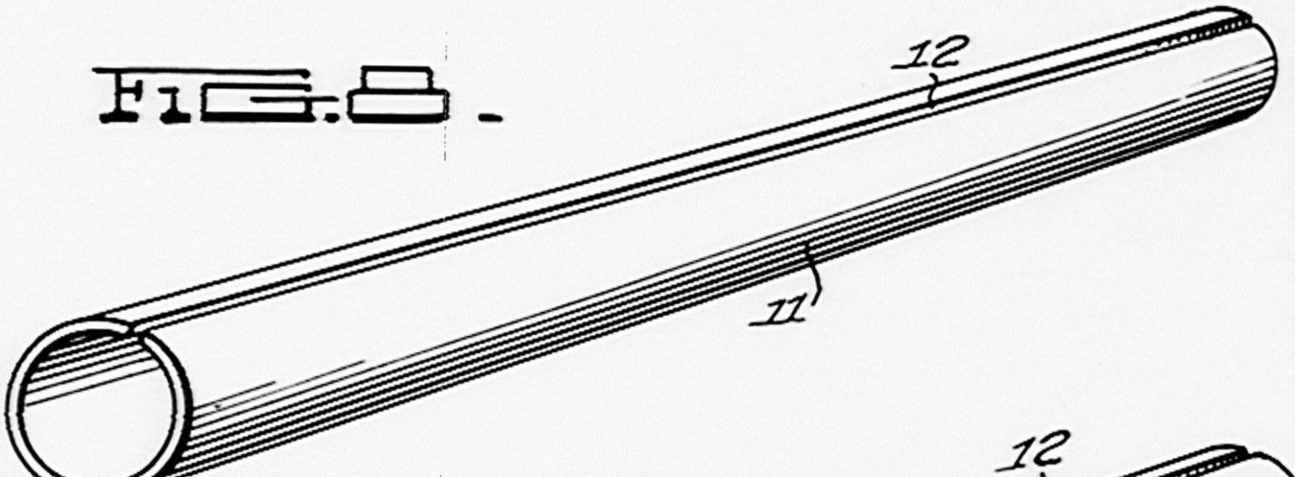


FIG. 9.

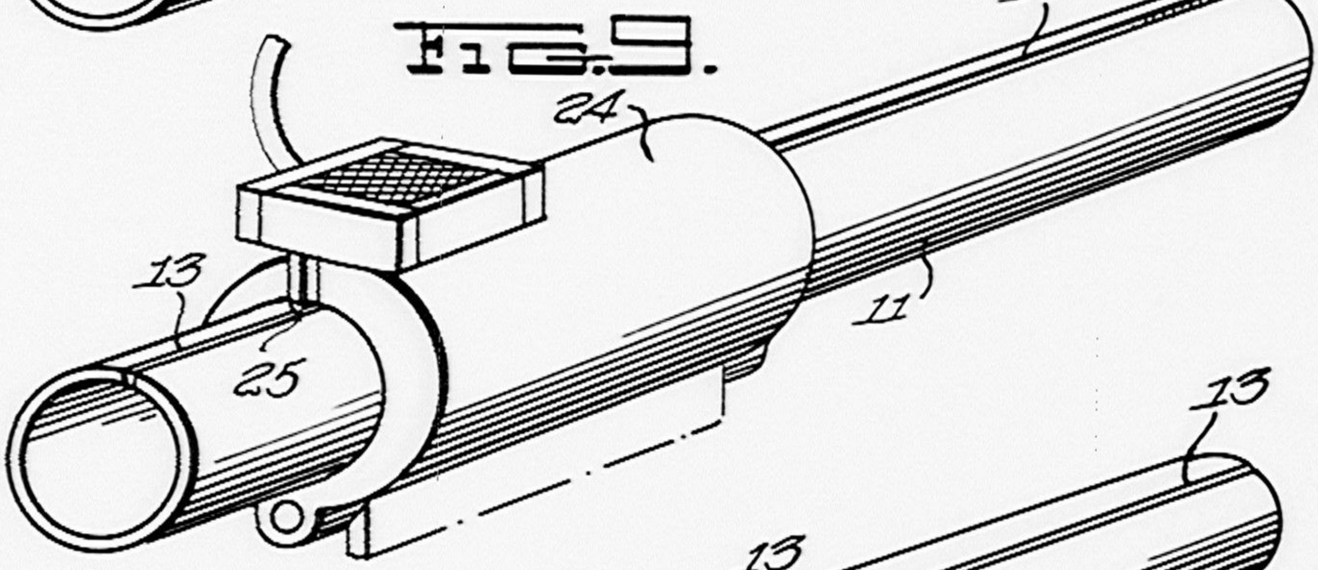


FIG. 10.

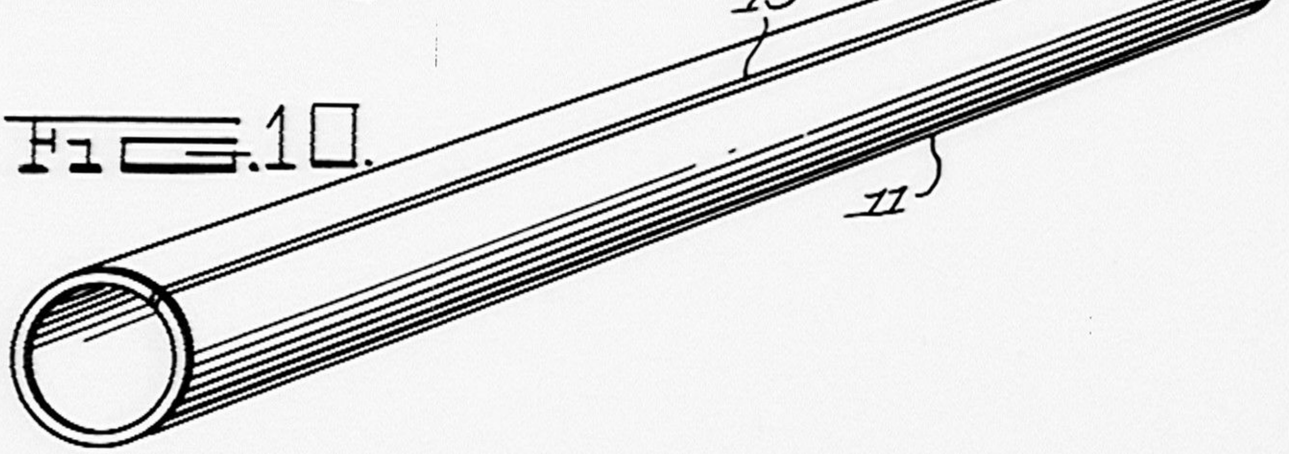
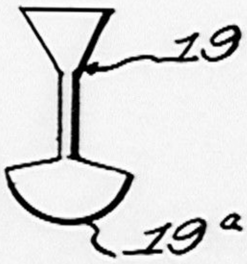


FIG. 11.



INVENTOR,
EMMOR H. MILLARD,
BY

his attorney.

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Paper No. 16

Mailed October 20, 1950, U. S. Patent Office, Board of Appeals

Appeal No. 21,847 LB
Hearing: September 25, 1950

IN THE UNITED STATES PATENT OFFICE
BEORE THE BOARD OF APPEALS

Ex parte Emmor H. Millard

Application for Patent filed January 23, 1948, Serial No. 3971. Method of Forming Tubes or Pipe.

M. E. Jones for applicant.

This is an appeal from the decision of the Primary Examiner finally rejecting claims 1, 3 to 8, inclusive, 10, 11 and 12, which are all of the claims in the application. By amendment filed September 25, 1950, appellant has authorized the cancellation of claim 6 and the appeal will be dismissed as to this claim.

Claim 12 is representative:

12. The method of forming a tube consisting in bending plate at a portion adjacent one edge thereof between an upper die having an arcuate male surface of approximately 120° and suspended by a relatively narrow web rigid therewith and a female surface of a lower die movable relatively to the first die while said portion is freely supported by one of the dies at opposite sides of the female surface, moving the plate across said surfaces and bending the plate along the portion thereof adjacent the other edge by means of said surfaces, while being freely supported by said one die at opposite sides of the female surface, returning the plate across said surfaces toward initial position, then moving the free edges of the portions of the plate toward each other through bending of the portion of said plate between said portions with said surfaces while freely supported by said one die at opposite sides of said female surface, in contacting said edges, and in welding said edges together to form pipe.

The references relied upon are:

Richter	1,831,033	Nov. 10, 1931
Baker	1,852,101	Apr. 5, 1932

The appealed claims are directed to a method of forming pipe from steel plate, the several steps of which are obvious upon reading the above noted claim.

The claims stand rejected as being unpatentable over the patent to Baker. This reference discloses a machine for forming pipe from sheet material wherein the same three basic operations contemplated by appellant are followed, namely, by successive downward pressing movements of the die, one margin of the sheet is pressed as shown in Fig. 4 and then the other margin is pressed as shown in Fig. 5 and finally the middle portion is pressed to produce the cylindrical form shown in Fig. 6. It is the Examiner's position that no invention would be required in providing the female die A of Baker with laterally extending work supporting portions whereby the material operated upon will be freely supported by such extended portions. In connection with claims 11 and 12, the Examiner has noted that it is common practice to connect the edges of cylinders by a welding operation as disclosed, for example, in Richter.

Appellant contends that the patent to Baker contains no disclosure of how the plate or sheet material is supported in carrying out the different steps contemplated by the patentee, whereas according to appellant's method the plate is freely supported for all steps in the operation. Appellant urges certain advantages in this last feature, one being that when the dies are separated from the edge bending positions of Figs. 3 and 5, the center of gravity of the plate material is to the right and left, respectively, of the vertical center of the dies and the plate will be supported when it is released from the pressure of the dies and returns to its horizontal position. Other points of difference are stressed by appellant in the brief, but so far as we have been able to determine these points do not appear as limitations in the actual steps of the method recited.

We have carefully considered all of the contentions and arguments in appellant's brief as well as those presented at the hearing, but we are not convinced thereby that there was reversible error in the conclusion reached by the Examiner. Claim 12 which is considered to be the most comprehensive claim of those on appeal recites the three basic steps of bending a plate where first one edge portion and then the other edge portion is pressed and finally the portion between the two edge portions is bent. As previously indicated, these steps are clearly disclosed in Baker. Claim 12 includes the feature of free support for the plate during each of the last-mentioned operations but, as noted by the Examiner, this goes more to the structure of the die than to the method of operation. Moreover, we are of the opinion that it would not involve the exercise of the inventive faculties to provide the Baker machine with a suitable support for the sheet material. The limitations in claims 8, 11 and 12 in respect to the male die being suspended by a narrow web, are also concerned with a particular structure of the die. Such structure finds substantial response in Baker, however, wherein it is stated that it is necessary to provide support for the die D substantially throughout its entire length, and that the strut member 1 is provided for that purpose. The particular formation of the male die as recited in claim 12, namely, that it has an arcuate surface of approximately 120°, constitutes a further reference to structure which has no patentable significance in the method step recited. However, we regard the male die of Baker as the full patentable equivalent of the die member of the claim for the purpose of the method recited. The step of welding called for in claims 11 and 12 is a conventional step as shown, for example, in Richter. We, therefore, sustain the rejection of claims 1, 3, 4, 5, 7, 8, 10, 11 and 12.

The appeal is dismissed as to claim 6.

The decision of the Examiner is affirmed as to the remaining claims.

In event of appeal attention is directed to *In re* Boyce, 32 CCPA 718; 144 F. (2d) 896; 1944 C. D. 609; 568 O. G. 568; 63 USPQ 80, in regard to specifically including in the appeal notice *all* grounds of rejection in the Examiner's Statement not expressly overruled by the Board.

E. W. Geniesse,
Examiner-in-Chief,
H. H. Jacobs,
Examiner-in-Chief,
A. W. Crocker,
Examiner-in-Chief,
(Acting),
Board of Appeals.

October 20, 1950.
M. E. Jones,
1029 Warner Bldg.,
Washington 4, D. C.

* * * * * * * * * *

Decision on Reconsideration

Paper No. 18

Mailed December 5, 1950, U. S. Patent Office, Board of Appeals

Appeal No. 21,847 MSP

IN THE UNITED STATES PATENT OFFICE

BEFORE THE BOARD OF APPEALS

Ex parte Emmor H. Millard

Application for Patent filed January 23, 1948, Serial No. 3,971. Method of Forming Tubes or Pipe.

Mr. M. E. Jones for appellant.

ON PETITION FOR RECONSIDERATION

Appellant requests reconsideration of our decision of October 20, 1950 which sustains the rejection of all of the claims of this application.

We have carefully studied our original decision in the light of the arguments presented but find no reason for altering our first conclusions. While it is true that the only claims before us were method claims, it is well established that the disclosure of an apparatus constitutes a competent reference against a process or method, the performance of which is obvious from or inherent in the apparatus disclosed. In the present case this doctrine may be extended to include unpatentable variations of the apparatus. As we have already indicated, we do not believe that it would require the exercise of the inventive faculties to provide the apparatus of the Baker patent with a suitable support for the sheet material.

The petition has been considered but is denied in respect to making any change in our decision.

H. H. JACOBS,
Examiner-in-Chief,
E. W. GENIESSE,
Examiner-in-Chief,
A. W. CROCKER,
Examiner-in-Chief,
(Acting),
Board of Appeals.

December 5, 1950.

* * * * * * * * * *

R. MINSHULL.

METHOD FOR MAKING SLOTTED TUBULAR TRACKS.

APPLICATION FILED NOV. 5, 1909.

977,118. Patented Nov. 29, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

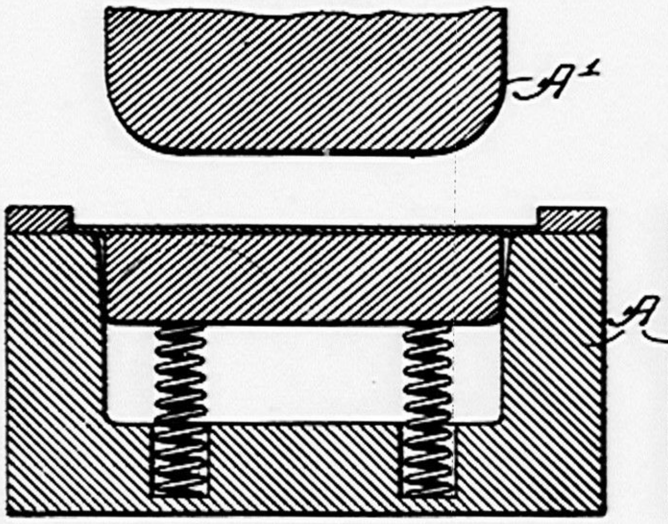


Fig. 2.

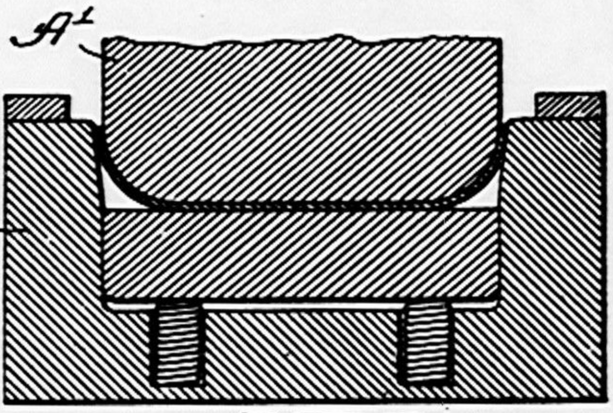


Fig. 3.

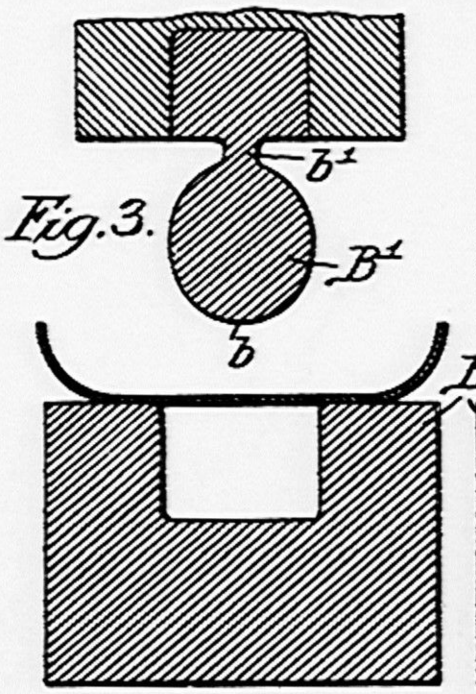


Fig. 4.

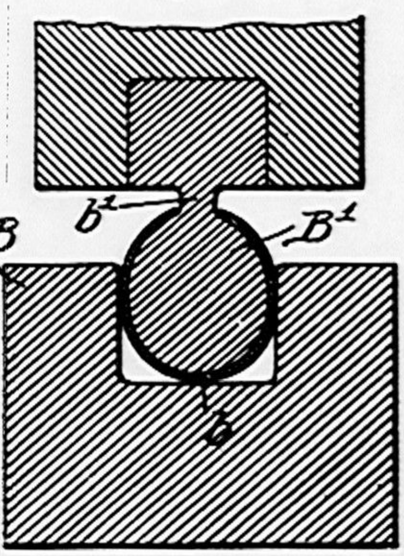


Fig. 5.

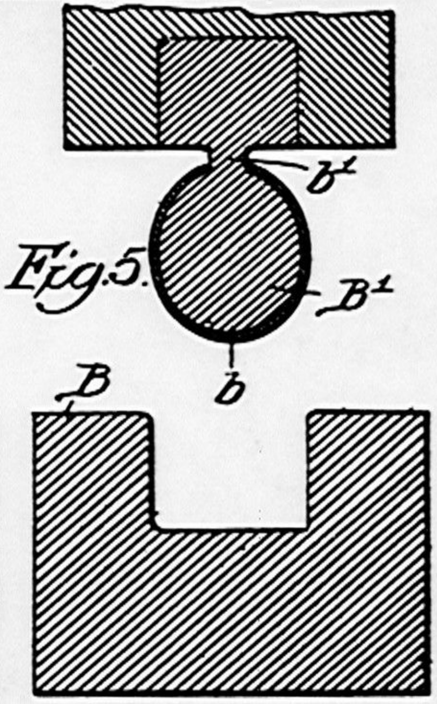
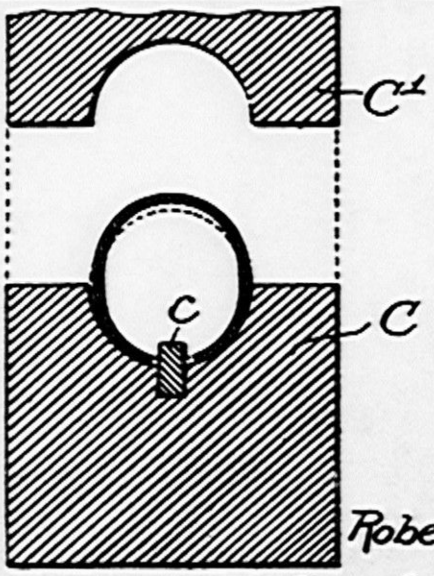


Fig. 6.



Witnesses:
John Enders
Chas. H. Bull

Inventor:
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By Dyrenforth, Lee, Chritton & Wiles
Attys.

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R. MINSHULL.

METHOD FOR MAKING SLOTTED TUBULAR TRACKS.

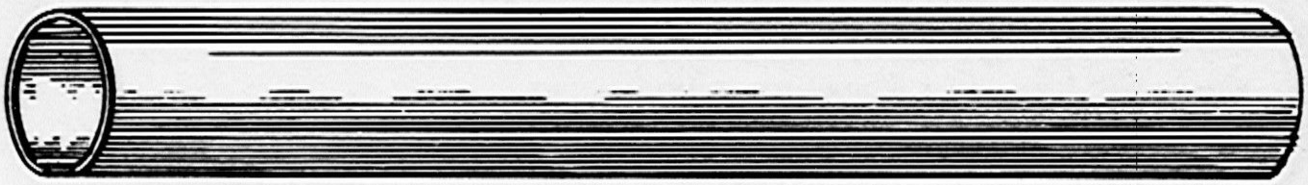
APPLICATION FILED NOV. 5, 1909.

977,118.

Patented Nov. 29, 1910.

2 SHEETS—SHEET 2.

Fig. 7.



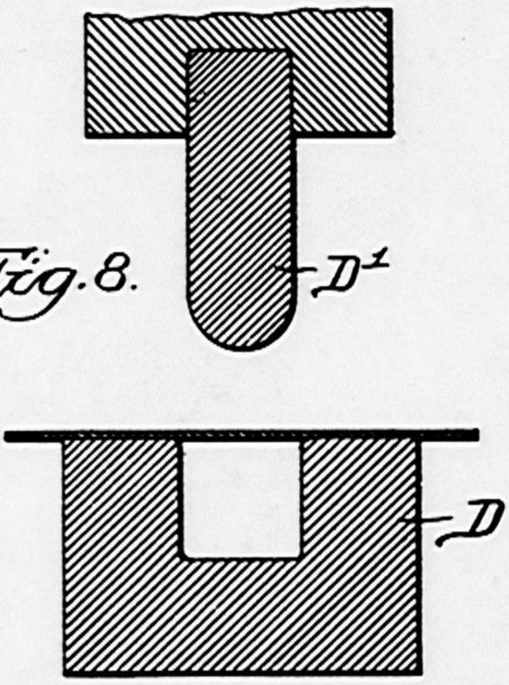


Fig. 8.

Fig. 9.

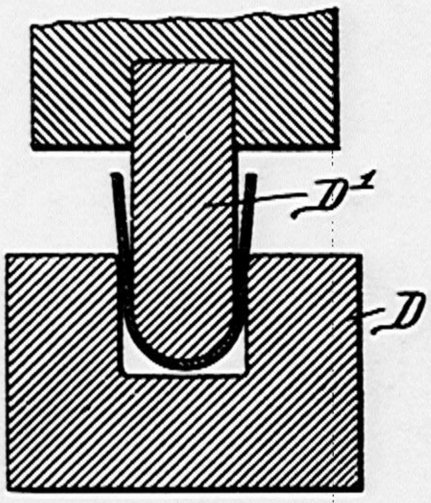


Fig. 10.

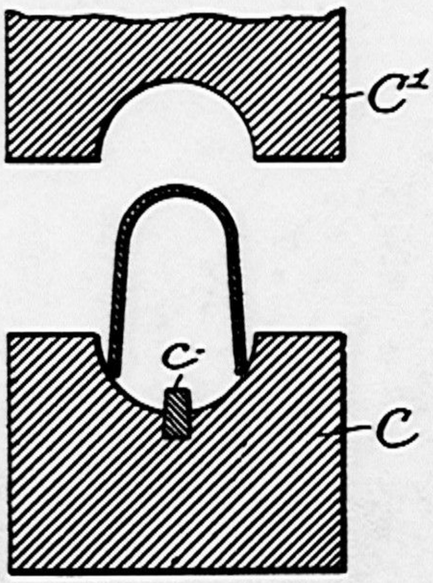
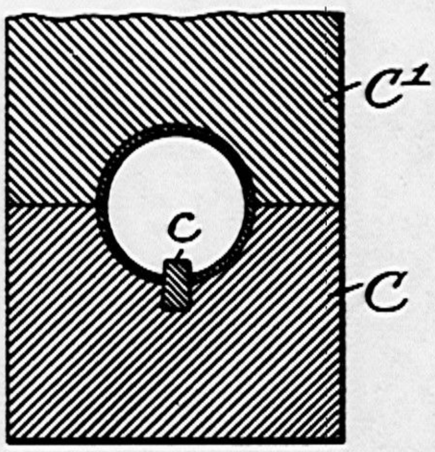


Fig. 11.



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By Dyrenforth, Lee, Chritton & Wiles

Attys.

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UNITED STATES PATENT OFFICE.

ROBERT MINSHULL, OF HARVARD, ILLINOIS, ASSIGNOR TO HUNT, HELM, FERRIS & COMPANY, OF HARVARD, ILLINOIS, A CORPORATION OF ILLINOIS.

METHOD FOR MAKING SLOTTED TUBULAR TRACKS.

977,118. Specification of Letters Patent. **Patented Nov. 29, 1910.**

Application filed November 5, 1909. Serial No. 526,466.

To all whom it may concern:

Be it known that I, ROBERT MINSHULL, a citizen of the United States, residing at Harvard, in the county of McHenry and State of Illinois, have invented a new and useful Method for Making Slotted Tubular Tracks, of which the following is a specification.

My invention relates to a certain new and useful method for making slotted tubular track and it consists in certain procedure and manipulation hereinafter more particularly set forth.

The various steps in following out my method are illustrated, together with the general nature of the apparatus useful for that purpose, in the accompanying drawings, in which:

Figure 1 shows the stock at the beginning of the first operation of the preferred form embodying my invention together with the apparatus used in the first operation; Fig. 2, a similar view illustrating the close of the first operation; Fig. 3, a view illustrating in cross-section the apparatus desirable for the second step of my prefererd form of method and the position which the stock occupies at the beginning of said step; Fig. 4, a similar view showing an intermediate portion of the second step; Fig. 5, a similar view at the close of the second step; Fig. 6, a view showing the position which the work occupies at the beginning of the third step of the preferred form of the method together with the apparatus used in practicing this step; Fig. 7, a perspective view of the completed work; Fig. 8 is a view similar to Fig. 1, showing the first step of a modified form of my method; Fig. 9, a similar view at the close of the first step of the modified method; Fig. 10 is a view showing the apparatus used in connection with the second step of the form of method, together with the work in the position which it occupies at the beginning of such step, and Fig. 11, a view similar to Fig. 10, showing the work at the close of the second step of the modified form of the method.

Referring to the drawings, particularly to Fig. 7, it will be seen that the track, or rail, which is manufactured in accordance with my invention is of that type which is slotted at the bottom and is adapted to receive within it a barn-door hanger having wheels, or rollers, roughly conforming to the curvature of the track, and having a hanger-portion which projects through and runs in the slot. In track of this character, there is a very powerful spreading strain which tends to open the track at the bottom, and the opening effect of this strain is greatly increased if the slot be made any wider than is necessary. It is also desirable, in connection with track of this kind that the slot be made of absolutely uniform width from end to end, in order that the hanger may not be bound on the one hand by too narrow a slot, or left free to wabble by too wide a slot.

The common method of making track of cylindrical form, which has no slot, is to bend the two edges of the blank which is to form the track, so that it takes roughly the form shown in Fig. 3 of the drawings, and then to place this blank in a vertical position on one side of a die of the type shown in Fig. 6, excepting for the spacing block at the bottom of said die, which as it descends upon the blank thus formed will roll the upwardly projecting edge into a complete curve, which will meet the lower edge of the blank at the bottom of the die. The obvious manner, to one skilled in the practice of making non-slotted track in this manner, for making slotted track, is to take a blank bent to the form shown in Fig. 3, then to place it in a die exactly like that shown in Fig. 6 with the spacing bar at the bottom and with one edge projecting up vertically, and then to bring the other die down upon it so as to bring the upper edge around almost to a complete circle until it touches the opposite side of the spacing bar at the bottom. This practice is open to two serious defects which are remedied by my present invention. In the first place that practice brings one edge of the blank up to the spacing-bar as the last operation of the process, and as a result, any inequalities in the width of the blank, which will almost inevitably occur, will be taken out of the width of the slot with exceedingly undersirable results, and in the second place, the track will have its edges brought together toward the spacing-bar so that any spring which the metal may have will tend to separate the adjacent edges. I have, therefore, departed entirely from the method used in making non-slotted track out of sheet-metal and have adopted the following general procedure. For the purpose of avoiding any possible springing of the track, I bend the blank to such a form that it has a sharper curvature at its center than is desired in the resulting track, and then in completing the track, I flatten this curvature so that any set which the metal may have tends rather to contract than to expand the slot whereby the track is made peculiarly resistant to spreading strains exerted by an inside hanger. I, furthermore, so manipulate the blank that its two edges are brought against the spacing-bar of the die before the ultimate curvature of the track is formed, whereby the slot will be made of absolutely the same width from end to end, it being formed first, and any inequalities of the blank will be taken up by irregularities in that part of the track whose bend is last formed, which will in practice be a part above the tread of the hanger where such irregularities can be of no possible detriment.

The various steps of my method are shown in detail in the drawings above described. Referring to the preferred form which is illustrated in Figs. 1 to 6, inclusive, it will be seen that the blank is first laid upon a female die A and struck by a male die A^1 having a flat central portion and two curved edges in the form of arcs of circles whose curvature is substantially that of the desired track. This brings the blank to the form shown in Fig. 3, from which figure it will be seen that the blank is then placed upon a female die B and struck by a male die B^1. The male die B^1 has a curved portion, oval in cross-section, the bottom portion *b* of which has a steeper curvature than that of the desired track. A narrow spacing-web b^1 connects this oval portion of the die B^1 with the movable member of the die-press in the manner illustrated. As this male die descends upon the blank, the blank takes the position thereon shown in Fig. 4, the two edges of the blank already formed wrapping themselves about the oval portion of the die. When the male die is raised, the blank can be slipped off endwise, when it will be found to be of oval form with a somewhat wider slot than it ultimately ought to have, and with a deeper curvature on its upper surface. In this condition the work is placed in the female part C of the die shown in Fig. 6, which said part is semi-cylindrical in form with a spacing-block *c* along its bottom. The work is then struck by the counter-part or movable portion C^1 of the die which is exactly like the part C except that it omits the spacing block. This bends the blank from the position shown in solid lines to that shown in dotted lines in Fig. 6. In the first instance, the edges of the blank are forced together on the spacing bar so that the slot becomes of exactly the desired width throughout its length and then as the moving die descends, the top of the track is flattened out to the desired curvature and the track is rounded in proper form. It will thus be seen that not only is any set which there may be in the metal of such a nature as rather to force the adjacent edges of the blank together in the completed track than to cause them to separate, but in addition any irregularities in the width of the blank will be taken up by the amount to which the blank will be flattened in that part of its width instead of being taken up in the width of the slot. The track thus produced is therefore stronger under the strains of use and more uniform from end to end than is track made by any method lying within the information of those skilled in the art of making round track.

Referring to Figs. 8 to 11, inclusive, the modified form of procedure is illustrated. In accordance with that method, the blank is laid on a female die D and struck by a male die D^1 which bends it into the form shown in Fig. 9, that is a U-shaped form with a sharper bend at the center than that which will ultimately be the bend of the top part of the track. After being placed in this position, the blank is inverted, as shown in Fig. 10, placed in a pair of dies exactly like the dies C, C^1 used in practicing the preferred form of my method. As the die C^1 descends, it first strikes the top of the blank and forces the lower edges thereof around the curvature of the die C until they strike the spacing-bar at the bottom, exactly as is the case when the blank is formed in the manner set forth in the preferred form of my method. After the edges have found the spacing-bar the remainder of the operation follows in the manner already set forth. It will be seen that this method partakes of the two important features of my method.

It will be understood that the two separate features of my method are of great importance individually, although their combination produces what I believe to be the most desirable method possible of making track of this character. It is, however, possible to devise methods whereby each feature may be used without the other. Thus it is probably possible to give the sharp curvature to the center of the blank even if my method of bringing the edges against the spacing-bar in the first instance is not adopted, and it is quite evidently possible to bring the edges of the blank against the spacing bar in the first instance and subsequently to form the remainder of the track to the desired curvature when the first sharp curvature is entirely omitted. I, therefore, by describing these two improvements in combination, wherein they are of particular and special advantage, do not in-tend to disclaim them individually, or otherwise to limit myself except as set forth in the following claims.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a method of manufacturing lengths of slotted hollow track, the steps which consist in imparting to the central portion of the blank a curvature sharper than that desired in the finished track, bringing the edges of the blank to the required distance apart to form the slot and thereafter pressing the blank into its final contour while resisting edgewise movement along substantially the length of the slot.

2. In a method of manufacturing lengths of slotted hollow track, the steps which consist in imparting to the central part of the blank a curvature sharper than that desired in the finished track, bringing the edges of the blank to the required distance apart to form the slot, resisting further movement of the edges of the slot toward each other, and pressing the blank into its final contour while the movement of the edges is so resisted.

ROBERT MINSHULL.

In presence of—
R. N. Jacobs,
S. E. May.

Nov. 10, 1931. W. E. RICHTER 1,831,033

APPARATUS FOR FORMING SHEET METAL

Filed Nov. 26, 1928

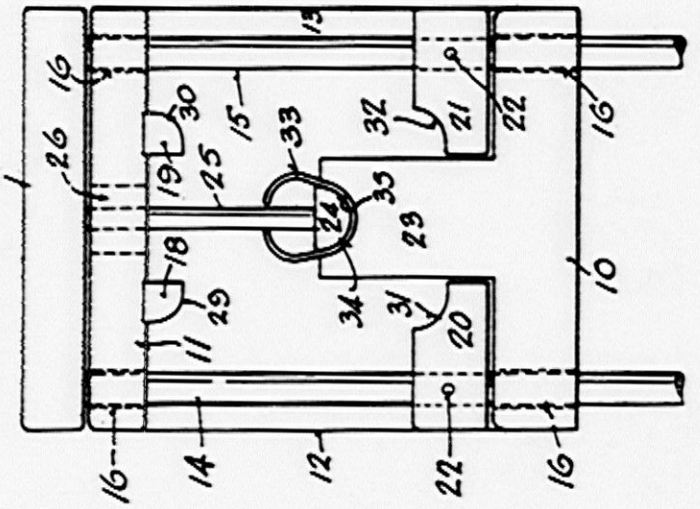

Fig. 3.

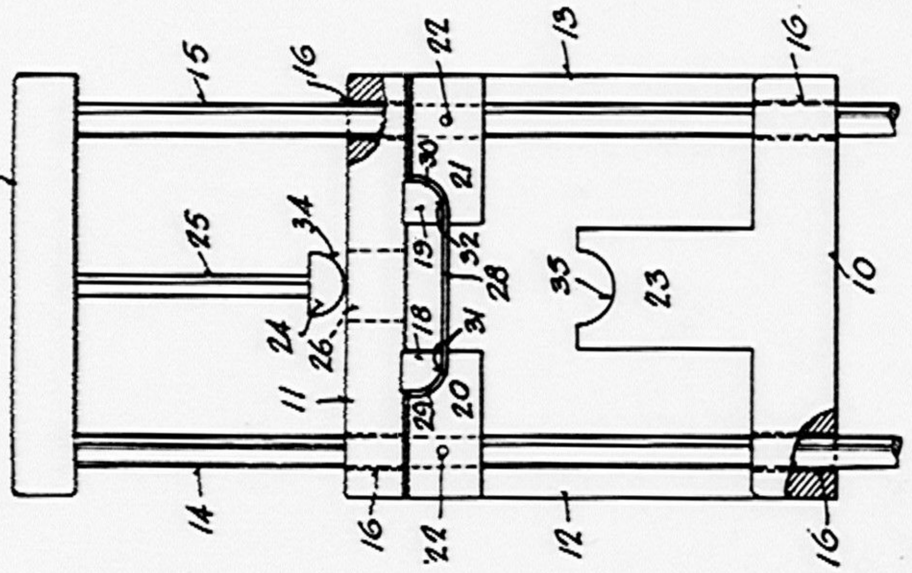

Fig. 2.

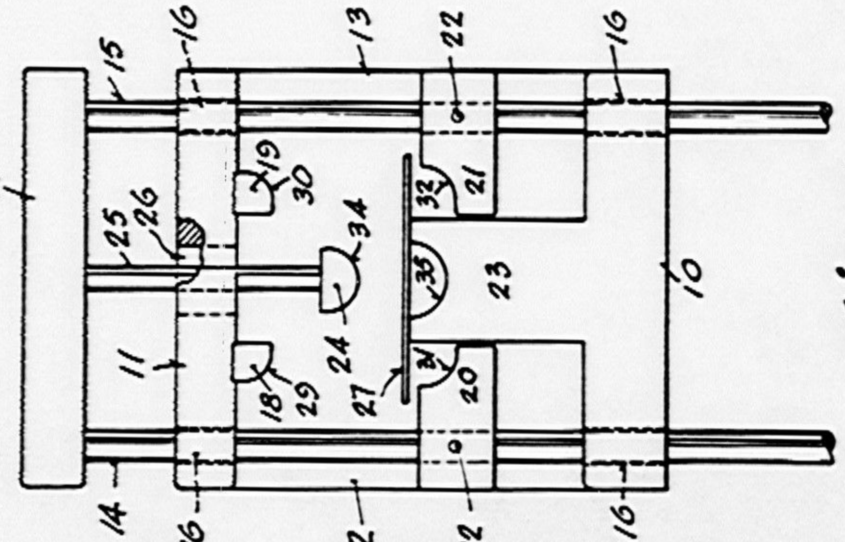

Fig. 1.

INVENTOR.
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BY Elwin A. Andrus
ATTORNEY.

Patented Nov. 10, 1931 1,831,033

UNITED STATES PATENT OFFICE

WALTER E. RICHTER, OF SHOREWOOD, WISCONSIN, ASSIGNOR TO A. O. SMITH CORPORATION, OF MILWAUKEE, WISCONSIN, A CORPORATION OF NEW YORK

APPARATUS FOR FORMING SHEET METAL

Application filed November 26, 1928. Serial No. 321,878.

The invention relates to an apparatus more particularly adapted to the performance of certain preliminary shaping operations upon sheet metal which is to ultimately become welded tubing.

In the manufacture of a welded tube from a flat sheet metal strip, several different forming operations upon the strip are required. The first operation as customarily performed consists in shaping the strip to U-form, this usually being accomplished by subjecting the strip to the action of a set of U-ing tools, constituted by an ordinary stamping punch and die, in a suitable press. The next operation is a crimping one adapted to shape the U-form or grooved strip to approximately tubular formation, ready for further operations designed to produce a truly cylindrical structure having a welded joint. To the performance of the said crimping operation, the U-form or grooved strip is removed from the U-ing punch and die of the press mentioned, and is subjected to the action of a set of crimping tools, also constituted by an ordinary stamping punch and die, in a different press.

It is a purpose of my invention to provide an apparatus adapted to the performance of the U-ing and crimping operations designed to shape a flat sheet metal strip to approximately tubular formation, and heretofore performed in separate presses, wherein the said operations will be combined to be capable of accomplishment by utilization of ordinary stamping punches and dies set up and correlated in a single press.

The full description now to be made of the apparatus and the manner in which it operates, will disclose the improved features of said apparatus.

Figure 1 is an elevational view of an apparatus made in accordance with the invention, disclosing all of the stamping punches and dies in their at rest positions, and a flat sheet metal strip positioned in said apparatus to be acted upon.

Fig. 2 is a view similar to Fig. 1, but disclosing the U-ing punches and dies as having acted to shape the sheet metal strip to U-form, and the crimping punch elevated to be clear of the U-ing operation.

Fig. 3 is a view similar to Figs. 1 and 2, but disclosing the crimping punch and die as having acted to shape the U-form strip into an approximately tubular structure, and the U-ing dies depressed to be clear of the crimping operation.

A stationarily supported frame of the apparatus includes spaced apart, horizontal, lower and upper frame members, represented 10 and 11, tied together in any convenient manner by spaced apart, vertical side frame members, designated 12 and 13, and a movable frame of said apparatus is constituted by spaced apart frame rods, indicated 14 and 15, vertically slidable in the frame members 10 and 11, as at 16, and a horizontal frame member 17 extending between and suitably connected to the upper ends of said rods and situated above the stationary frame in vertical alignment with the frame members 10 and 11 thereof.

The stationary frame member 11 carries downwardly extending, spaced apart, fixed U-ing punches, denoted 18 and 19, which are secured to said frame member in any ordinary or preferred manner, and the rods 14 and 15 support spaced apart, movable U-ing dies, indicated 20 and 21, which are rigidly secured upon said rods, as at 22, between the frame members 10 and 11, to be in vertical alignment with, and complemental to, said fixed U-ing punches.

The stationary frame member 10 carries an upwardly extending, fixed crimping die 23, which is, as disclosed, integral with said frame member and between and in the same vertical plane as the U-ing dies 20 and 21, and the frame member 17 supports a movable crimping punch 24, which is attached to said member 17 by a relatively thin neck piece 25 to be in vertical alignment with, and complemental to, said fixed crimping die. An opening 26 through the stationary frame member 11 allows passage of the movable crimping punch 24 and its neck piece 25.

The complemental U-ing punches and dies, 18, 20, and 19, 21, are adapted to simultaneously operate upon the full width of the opposite end portions of a strip of sheet metal, such as indicated at 27 in Fig. 1, and curl said end portions upwardly to form them into part-circle configuration, to thus shape the blank to U-form, as indicated at 28 in Fig. 2. To this end, the spaced apart punches 18, 19 are provided with outwardly facing part-circle shaping faces 29, 30 which extend the full width of the strip, as clearly shown in Fig. 1. The dies 20 and 21 include cooperating concave shaping faces 31 and 32 complementary with the punches 18 and 19 and also extending the full width of said strip.

The complemental crimping punch 24 and crimping die 23 are adapted to operate upon the full width of a portion of the U-form blank at its midlength, to shape said blank to approximately tubular formation, as indicated at 33 in Fig. 3. To this end, the punch 24 includes a convex part-circle crimping face 34, midway between the faces 29 and 30 of the punches 18 and 19, which extends the full width of the blank and tangentially to the horizontal, and the die 23 includes a cooperating concave crimping face 35, also extending the full width of said blank, correspondingly configurated and disposed. The action of the complemental crimping faces 34 and 35 is to throw the end portions of the U-form blank to positions adjacent the thin neck piece 25, but with the edges of said blank sufficiently separated to permit the structure 33 of approximately tubular formation to be pulled lengthwise from about the punch 24.

A flat strip of sheet metal, such as the strip 27, to be shaped to approximately tubular formation, is inserted in the apparatus and situated in proper position to be acted upon by the U-ing tools. As disclosed in Fig. 1, the strip is resting upon the die 23 directly above the movable U-ing dies 20 and 21 and beneath the fixed U-ing punches 18 and 19. The movable frame is then elevated to cause said U-ing dies to lift the strip to said U-ing punches and cooperate with the punches, in the manner clearly disclosed in Fig. 2 and already set forth, to provide the U-form blank 28. The movable frame is then depressed to cause the U-ing dies to situate the U-form blank upon the fixed crimping die 23 in position to be acted upon by the movable crimping punch 24, and said movable frame is further depressed to cause said crimping punch to cooperate with said crimping die, in the manner clearly disclosed in Fig. 3 and already set forth, to provide the structure 33 of approximately tubular formation.

The movable frame can be operated in any manner which may be convenient. Preferably, it is hydraulically operated.

Having thus described the invention, what I claim and desire to secure by Letters Patent of the United States, is:

1. A machine for shaping a flat sheet metal strip into an approximately tubular structure, comprising a pair of relatively movable frames, a U-ing punch upon one of said frames, a complementary cooperating U-ing die upon the other frame, said U-ing punch and die being disposed to crimp both edges of the metal sheet simultaneously, a crimping punch upon the same frame as the U-ing die, and a complementary cooperating crimping die upon the frame carrying the U-ing punch, said crimping die being disposed to receive the U-ed metal sheet from the U-ing die and to cooperate with the crimping punch to form the same into substantially tubular shape throughout its length.

2. A machine for shaping a flat sheet metal strip into an approximately tubular structure, comprising a pair of relatively movable frames, a crimping punch upon one of said frames, a complemental cooperating crimping die upon the other frame, spaced apart U-ing punches upon the frame having said crimping die arranged at each side of said crimping punch and opposite said crimping die, and complemental cooperating spaced apart U-ing dies upon the frame having said crimping punch arranged at each side of said crimping die and opposite said crimping punch, all of said punches and dies being in the same plane.

3. A machine for forming a tubular blank from a metal sheet which comprises two separate pairs of die members, means operating one pair of said die members to form the metal sheet into U-shape and to thereafter withdraw said die members therefrom, said means being operable to cause said second pair of die members to form the U-shaped blank into substantially tubular shape.

4. A machine for forming a tubular blank from a metal sheet which comprises a plurality of separate pairs of die members, and means for operating said pairs of die members successively to form the metal sheet in successive steps into a tubular blank, each pair of die members being adapted to be withdrawn from the sheet metal blank prior to the action of the next succeeding pair of die members thereon.

5. A machine for forming a tubular blank from a sheet metal strip, comprising two relatively movable frame members and two separate pairs of die members carried by said frame members for successive operation on the sheet metal strip by reversal in movement of said frame members relative to each other.

6. In a machine for performing die pressing operations to make tubular blanks, in combination, two pairs of complementary dies disposed for relative reciprocatory movement to perform die pressing operations, the complementary dies being disposed to perform successive die pressing operations as they reciprocate in opposite directions.

7. In a machine for performing die pressing operations to make tubular blanks, in combination, two pairs of complementary dies disposed for relative reciprocatory movement to perform die pressing operations, the dies of one pair being disposed to deliver the blank to the dies of the other pair as the dies reciprocate, to provide for the performing of successive die pressing operations upon the blank.

8. In a machine for performing die pressing operations to make tubular blanks, in combination, two pairs of complementary dies disposed for relative reciprocatory movement to perform die pressing operations, the dies of one pair being disposed to operate inside the dies of the other pair to provide for performing successive die pressing operations as the dies reciprocate in opposite directions and to deliver the blank from one pair to the other pair of dies.

9. In a machine for performing die pressing operations to make tubular blanks, in combination, two pairs of complementary dies disposed for relative reciprocatory movement to perform die pressing operations, the complementary dies of one pair being disposed to be actuated into cooperative relation to perform a die pressing operation while the complementary dies of the other pair are separated to provide for delivering the blank from one set of dies to the other and performing successive die pressing operations.

10. In a machine for performing die pressing operations to make tubular blanks, in combination, two pairs of complementary die members, and means for effecting relative reciprocating movement of the complementary dies, the die members being so disposed that as the die members of one pair are actuated into pressing relation the die members of the other pair are separated, a transfer of the blank being operated upon from one die member to another being effected by the dies as they move relative to one another.

11. In a machine for performing die pressing operations to make tubular blanks, in combination, two pairs of complementary die members, and means disposed to be given a reciprocating motion for actuating the die members relative to one another, the dies being disposed on the actuating means in such relative positions that as one pair of cooperating dies moves toward pressing relation the other pair is separated, the blank being transferred from one die member to another as a result of the reciprocating movement, thereby to perform two pressing operations and complete a blank for each complete reciprocating movement of the actuating means.

12. In a machine for performing die pressing operations to make tubular blanks, in combination, two pairs of complementary die members, a frame carrying one die member of each pair, means disposed for reciprocating movement carrying the other die members, the die members being so disposed that one pair of die members cooperate to perform a die pressing operation when the actuating means is moved in one direction and the other pair of die members function to perform a die pressing operation when the actuating means is moved in the opposite direction, thereby to perform two die pressing operations for each complete reciprocating movement of the actuating means.

13. In a machine for performing die pressing operations on sheet material, in combination, two pairs of complementary die members, a frame supporting one die member of each pair, means disposed for reciprocating movement carrying the other die members, the pairs of die members being disposed to perform die pressing operations as the reciprocating means is actuated in opposite directions, and to transfer the sheet material from one die member to another as one pair of die members is being separated and another pair actuated into pressing relation thereby to perform successive die pressing operations as the means for actuating the die members is moved in opposite directions.

In testimony whereof I have signed my name at Milwaukee, Wisconsin, this 24th day of November, 1928.

WALTER E. RICHTER.

April 5, 1932. J. F. L. BAKER 1,852,101

CYLINDER FORMING MACHINE

Filed Jan. 7, 1929

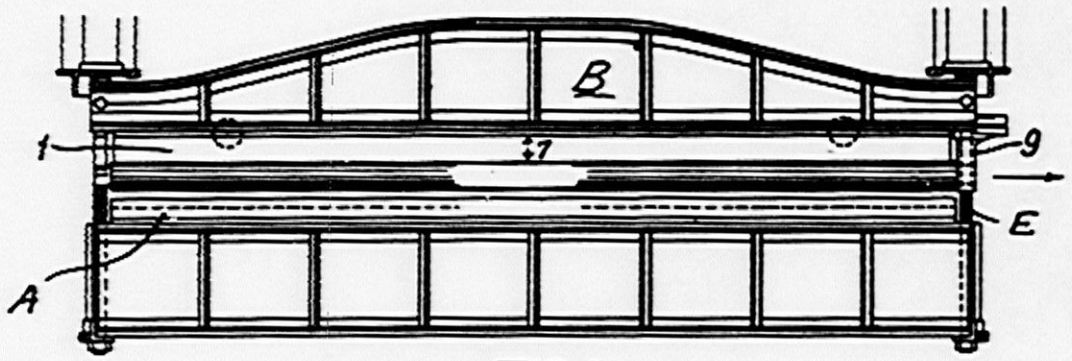

FIG.1

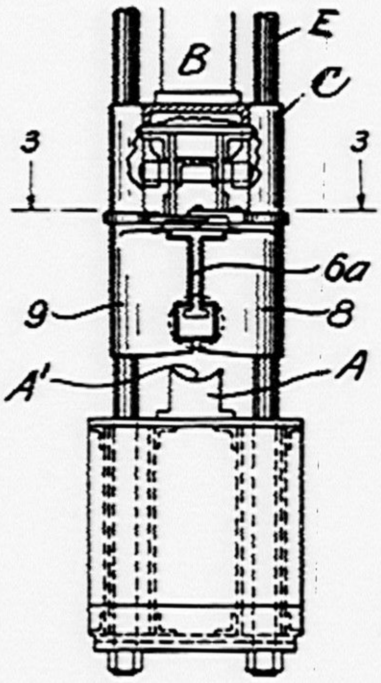

FIG.2

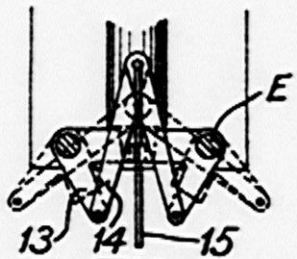

FIG.3

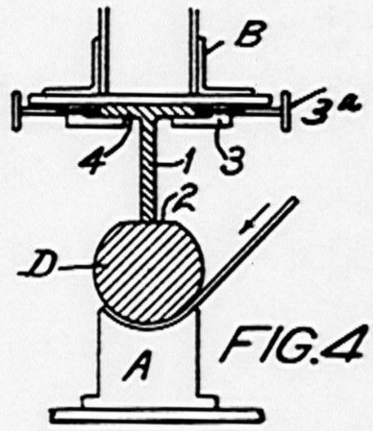

FIG.4

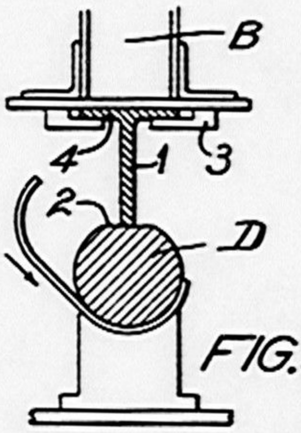

FIG.5

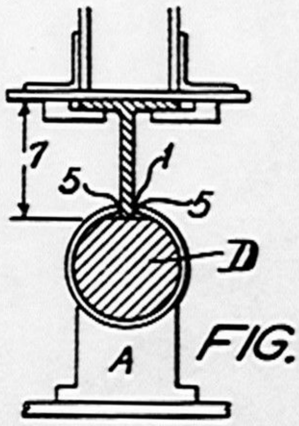

FIG.6

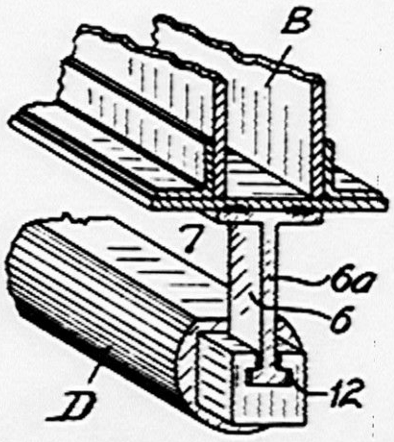

FIG.7

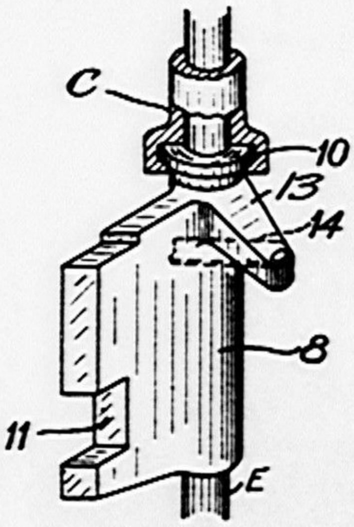

FIG.8

John F.L. Baker INVENTOR

BY George B. Willcox

ATTORNEY

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Patented Apr. 5, 1932 **1,852,101**

UNITED STATES PATENT OFFICE

JOHN F. L. BAKER, OF SAGINAW, MICHIGAN, ASSIGNOR TO WICKES BOILER CO., OF SAGINAW, MICHIGAN, A CORPORATION OF MICHIGAN

CYLINDER-FORMING MACHINE

Application filed January 7, 1929. Serial No. 330,804.

This invention relates to a machine for forming heavy steel sheets, light and medium plates, or similar material, into tubes, such as water pipes and the like.

A cylinder-forming machine of the kind above referred to is shown and described and claimed as to its broader aspects in my copending application Serial No. 170,191, filed February 23, 1927, patented January 15, 1929, No. 1,698,904 of which the present application is a continuation-in-part. That machine is adapted for bending a very heavy steel plate, say, two inches thick, into a tube, say, ten feet long and about forty inches diameter.

My present invention adapts a machine of that general class to a somewhat different kind of work, namely, the rapid production of cylinders from thinner material and shaped to smaller diameter. For example, this invention is adapted for bending into accurate cylindrical form a sheet of steel whose thickness is, say, five-eighths inch, width four feet, length forty feet, producing a cylinder fifteen inches diameter, the forming operation being performed in such manner that the longitudinal edges of the finished tube will be slightly separated and parallel to each other ready to be closed together in a subsequent operation on a different machine and finished by welding or riveting.

In general the type of cylinder forming machine comprehended in my co-pending application above referred to comprises an anvil formed with a longitudinal groove in its working face, a movable die-carrying frame comprising a strong-back having downwardly projecting crossheads near its ends, a die having its ends mounted in the crossheads and disposed normally parallel with the anvil. The die is adapted to press the sheet progressively into the groove. The strong-back and die are spaced apart to receive the curved part of the sheet between them. Means is provided for actuating the die-carrying frame, as for example, a hydraulic engine, and provision is made for detaching an end of the die from the frame to permit the removal of the completed cylinder.

The specific means illustrated in my previous application above referred to for removing the finished work consists of a pivotal connection between the reciprocating frame and an end of the die, the other end of the die adapted to be swung out from its normal position in the frame to permit removal of the completed cylinder.

The previous application also describes the use of removable struts connecting the strong-back and die, in order to prevent any appreciable springing of the die when subjected to heavy duty.

My present invention embodies certain improvements in the form of the die, in the construction and arrangement of the struts between the die and the strong-back and in the means for supporting the end of the die while the completed work is being stripped from it.

Moreover, the present invention includes an improved die-supporting means that permits the work to be removed without swinging the die outwardly from its normal position. The structure also includes a new kind of cross-head attached to the strong-back. This cross-head embodies what I term a die keeper, being a hinged member adapted to operatively engage when closed, an end of the die and adapted to be opened and closed so as to release the end of the die and afford passage for the finished work during its removal from the die.

With the foregoing and certain other objects in view which will appear later in the specification, my invention comprises the devices described and claimed and the equivalents thereof.

In the drawings Fig. 1 is a side elevation of a tube-forming machine embodying my improvement.

Fig. 2 is an enlarged fragmentary end view showing the die in raised position.

Fig. 3 is a view of the gate-actuating mechanism as seen from above.

Figs. 4, 5 and 6 are respectively sectional details showing the various steps in the forming of a tube.

Fig. 7 is a perspective view partly in section showing the hanger connection between the delivery end of the die and the strong-back.

Fig. 8 is a perspective view partly in section, of one of the leaves of the keeper.

As is clearly shown in the drawings, a machine embodying my invention consists in the anvil A whose upper face is formed with a longitudinal groove A', a working frame, which consists in a vertically reciprocatable strong-back B having crossheads C at its ends carried upon suitable guide-rods E and a die D carried by the crossheads, the die being below and spaced from the strong-back B to permit the curved part of the plate to enter between them.

Since the tube to be formed is of light material, but very long and of small diameter, it becomes essential to support the die D throughout substantially its entire length so as to avoid all possibility of upward springing. It is not absolutely necessary that the strut member 1 which is inserted between the top of the die and the strong-back shall extend as a continuous piece throughout the entire length of the die D, but the points of support should be sufficiently close together to prevent any appreciable springing of the die. I have, therefore, shown as an example a strut member 1 which is preferably a plate standing edgewise on the top face 2 of the die made substantially flat for that purpose. The strut member 1 is carried by the strong-back B and is held upright, that is, perpendicular, to the flat face 2 of die D by lugs 3 or other suitable means on the strong-back. The lugs engage a pair of flanges 4 on the strut plate 1, as shown in Figs. 4 to 6, so the latter may have limited sidewise movement on the upper face of the die, to prevent its binding when it is engaged by the edges 5 of the tube at the completion of the bending operation, as shown in Fig. 6. The sidewise movement can be limited, as desired, by means of adjusting screws 3*a*, threaded in lugs 3, as shown in Fig. 4.

The strut member 1 effectually prevents springing of the die D and transmits directly from the die to the strong-back all stresses that would otherwise cause the die to bow upward in the middle under load.

The delivery end of the die is held suspended from the strong-back by means of a die-supporting hanger 6, preferably in the manner shown in Fig. 7. Since the work is to be removed from the die D by stripping it off endwise in the direction of the arrow, Fig. 1, that portion 6*a* of the hanger which spans the space 7 between the strong-back B and die is made thinner than the slit between the longitudinal edges 5 of the formed tube. The tube when being stripped off from the anvil passes the hanger 6 the same as it passes strut member 1, shown in Fig. 6.

Whenever a piece of work is being removed from the machine, the hammer 6 supports the delivery end of the die but while the work is being shaped by the die D the working load is transmitted from the crosshead to the die by means of a keeper 8, 9, made so as to be opened and closed. This die keeper is adapted when closed to operatively grasp an end of the die D and when opened is adapted to release the die and swing out of the way to afford passage for the finished work during its removal from the die.

I have devised a suitable form of keeper which is shown in Figs. 2, 3 and 8. It consists in a pair of hinged leaves 8, 9, the knuckles of which are provided with flanges 10 by which they are swiveled in counterbores provided at the lower ends of the crossheads C. The free edge of each leaf is formed with a recess 11 to fit over the end of the die which may be shaped for the purpose, as shown at 12 in Fig. 7, or if desired the recess 11 in the leaf may be made to conform to the shape of the body of the die itself. When the two leaves are closed, as shown in Fig. 2, they form practically integral parts of the crosshead C, so the strong-back and the end 12 of the die are at such times connected together by an exceedingly strong connection capable of withstanding the enormous working pressures that are transmitted through it from the hydraulic engine to the die. Thus when the leaves 8, 9 are closed the entire crosshead is, for practical purposes, the equivalent of a unitary casting, but when the leaves are opened they afford free passage through which the tube can be pulled lengthwise and removed from the die D.

The leaves can be opened and closed simultaneously by any suitable means, as for example that shown in Fig. 3, where each leaf is provided with an outwardly projecting arm 13 having a link 14 pivoted to it, the other ends of the links being pivoted together after the manner of a toggle joint which can be actuated by an operating bar 15 to open and close the leaves, as indicated by the dotted and full lines.

When the machine is in operation the leaves are closed and the sheet of material is fed in between the die and anvil, as shown in Figs. 4, 5 and 6, the successive downward pressing movements of the die causing the material to curl around it. Preferably one margin is operated on, as shown in Fig. 4, and then the other margin, as shown in Fig. 5, and lastly the middle part as shown in Fig. 6, requiring three operations in all to finish. The final shape and position of the finished sheet is indicated in Fig. 6, where the two longitudinal edges 5, 5 are spaced apart, presenting a slit through which the strut member 1 projects. If the work happens to require it, a slight sidewise movement of the strut member may take place in the lugs 3, thus preventing binding or cramping, and keeping the die D free from any lateral strains that might otherwise be brought upon it by the pressure of the work against the side of the strut member 1.

To remove the work the hinged members or keepers 8, 9 are opened outwardly, as indicated by the dotted lines in Fig. 3, after which the work can be stripped from the die, the thin portion 6*a* of the hanger shown in Fig. 7, permitting its passage.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a tube forming machine including vertically reciprocatably crossheads, a strong-back connecting the same and a die carried by said crossheads below and spaced from said strong-back, the top of the die formed to present a substantially flat bearing face, a strut member inserted between said face and strong-back, means on the strong-back holding the strut member in operative position yet permitting its limited sidewise movement upon said bearing face, a die-supporting hanger connecting the delivery end of the die with the strong-back, that portion of the hanger which spans the space separating the strong-back and die formed to be received between the longitudinal edges of the formed tube, a die keeper pivotally mounted on one of said crossheads so as to be opened and closed ~~and~~ adapted when closed to operatively engage an end of said die and when opened adapted to release the die to afford passage for the finished work during its removal from the die.

2. In a tube forming machine including vertically reciprocatable crossheads, a strong-back, a die carried by said crossheads below and spaced from said strong-back, a strut member inserted between said die and strong-back, means on the strong-back holding the strut member in operative position yet permitting its limited sidewise movement, a hanger connecting the delivery end of the die with the strong-back, that portion of the hanger which spans the space separating the strong-back and die formed to be received between the longitudinal edges of the formed tube.

3. In a tube forming machine including vertically reciprocatable crossheads, a strong-back, a die carried by said crossheads below and spaced from said strong-back, a strut member inserted between said die and strong-back and means on the strong-back holding the strut member in operative position yet permitting its limited sidewise movement, for the purposes set forth.

4. In a tube forming machine including vertically reciprocatable cross heads, a strong-back, a die carried by said crossheads below and spaced from said strong-back, a strut member inserted between said die and strong-back capable of limited sidewise movement, a die-supporting hanger connecting the delivery end of the die with the strong-back, a die keeper pivotally mounted on one of said crossheads so as to be opened and closed and adapted when closed to operatively engage an end of said die and when opened adapted to release the die to afford passage for the finished work during its removal from the die.

5. In a tube forming machine including vertically movable crossheads, a strong-back, a die carried by said crossheads below and spaced from said strong-back, a die keeper comprising a pair of oppositely hinged leaves pivotally mounted on one of said crossheads so as to be opened and closed and adapted when closed to operatively engage an end of said die and when opened adapted to release the die to afford passage for the finished work during its removal from the die, and means for supporting the delivery end of the die from the crosshead.

In testimony whereof, I affix my signature.

JOHN F. L. BAKER.

BRIEF FOR APPELLEE

United States Court of Appeals
For the District of Columbia Circuit

United States Court of Appeals
For the
District of Columbia Circuit

FILED MAR 2 1953

Joseph W. Stewart
CLERK

Appeal No. 11607

EMMOR H. MILLARD, *Appellant*

v.

Robert C. Watson

~~JOHN A. MARZALL,~~ Commissioner of Patents,
Appellee

Appeal From the Judgment of the United States District Court for the District of Columbia

E. L. REYNOLDS,
Solicitor, United States Patent Office,
Attorney for Appellee

APPEAL NO. 11607

STATEMENT OF QUESTION PRESENTED

In the opinion of the appellee, the question presented by this appeal is whether there is substantial evidence to support the holding of the trial court that the appellant's assembly in a single structure of features which were individually old in the prior art was not a matter of invention.

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United States Court of Appeals
For the District of Columbia Circuit

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EMMOR H. MILLARD, *Appellant*

v.

JOHN A. MARZALL, Commissioner of Patents,
Appellee

Appeal From the Judgment of the United States District Court for the District of Columbia

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BRIEF FOR THE COMMISSIONER OF PATENTS

INTRODUCTION

This is an appeal from the judgment of the United States District Court for the District of Columbia (11)* dismissing the complaint in an action under R. S. 4915 in which the appellant, the plaintiff below, sought to have the court authorize the issuance of a patent containing claims 3, 4, 5, 7, 8, 10, 11, and 12 of his application No. 3971 for patent on a method of forming tubes or pipe from metal sheets. The method claimed is clearly illustrated in Figures 2 to 7 of the application drawing (42) and comprises bending first one edge, then the other, and finally the central portion of a sheet of metal between dies to form a tube, the edges then being welded together.

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* The numbers in parentheses refer to pages of the joint appendix.

SUMMARY OF ARGUMENT

1. The patent to Baker No. 1,852,101 shows essentially the method described and claimed by the appellant.

2. Those features of the appealed claims which are not specifically disclosed by Baker are old in the art and their inclusion in Baker's process would not be a matter of invention.

ARGUMENT

The principal reference is the patent to Baker No. 1,852,101 (60) which, as best shown in figures 4, 5, and 6, discloses the same successive forming of a sheet between dies to form a tube as does the appellant's application. The three alleged differences between the two disclosures are as follows:

(1) Baker allegedly withdraws the sheet from the die and inserts it from the opposite side between the two edge bending operations shown in his Figs. 4 and 5, whereas appellant passes the sheet through the dies between those two operations.

(2) The web 20′ of appellant's device is fixedly secured to the die 19 whereas the corresponding web 1 of Baker is not so secured.

(3) Appellant provides work supporting surfaces adjacent the cavity in his lower die, while Baker does not. Those distinctions are scattered through the several claims, although it is not clear that any single claim contains all of them. However, as will now be pointed out, none of the distinctions involves invention and, since they have no special coaction with each other, invention is not defined by reciting two or more of them in a single claim.

It is submitted that passing the sheet through the dies after forming one edge and before forming the other would be the most obvious method of moving it from one position to the other. This was expressly conceded by the appellant's witness Bradburn (Appendix, page 18, Qs. 67 and 68), and the testimony of the witness Hutchinson (Appendix, page 26, Q. 54) is generally to the same effect. Even the inventor himself (Appendix, pages 31 and 32), while he would not concede that the idea was obvious, was unable to point out why it was not, or how it would involve any difficulty. In view of that testimony, and of the very simple nature of the step, it is thought that the holding of the Patent Office and the Court below that no invention would be involved is clearly correct.

With respect to the formation of the web, it is to be noted that claims 8 and 12 which are the only claims that refer to that construction, merely state that the web is rigid with the upper die, not that it is integral therewith. This would not appear to distinguish over the Baker construction in which the web would normally be tightly held against the die D. Moreover, it is common to make such a web integral with the die, as shown by the Minshull patent, and there would clearly be no invention in employing such an arrangement in the Baker device. There is no real evidence that such a change would produce any advantage, since none of the witnesses claimed to have seen the Baker device in actual operation. Comparative tests are a minimum requirement where superiority over prior art is relied on as basis for patentability (Blanchard v. Ooms, 80 U. S. App. D. C. 400, 153 F. 2d 651).

The third feature relied on by the appellant is the provision of work supporting surfaces at the sides of the lower die member. As to that feature, the plaintiff's witness Bradburn (Appendix, page 19, Qs. 78 and 79) testified that the use of such supports in the Baker device would be obvious. In the face of such testimony by his own witness, the appellant is not in a favorable position to contend that the provision of supports would be a matter of invention.

It is to be noted, moreover, that the claims here involved are all method claims and that patentability of such claims may not properly be predicated on differences in apparatus (In re Fessenden 45 App. D. C. 21; In re Freeman et al., 108 F. 2d 244, 27 CCPA 795). Baker's sheet would necessarily rest on the edges of the concave lower die while being shaped and this would apparently satisfy the requirement of certain claims that the work be freely supported at opposite sides of the die.

The welding step recited in some of the claims is conventional and is not alleged to be patentable.

CONCLUSION

It is submitted that the record affords ample support for the conclusion of the trial court that the appellant's method involves nothing more than obvious modifications of the Baker process; and that the decision appealed from should accordingly be affirmed.

Respectfully submitted,

E. L. Reynolds,
Solicitor, United States Patent Office,
Attorney for Appellee

March, 1953

☆U.S. GOVERNMENT PRINTING OFFICE 1953—242686/P.O. 1165